Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
1	--	--	The Draft Fourth Five-Year Review, Hunters Point Naval Shipyard, San Francisco, California, July 2018 (the FYR) does not adequately discuss the Tetra Tech EC Inc. potential contractor manipulation and/or falsification of radiological data at Hunters Point, and its effect on the protectiveness of the radiological remedies. Some of the fraudulent activity has been confirmed through enforcement actions. The interviews in Appendix B of agencies and 17 community residents show that this issue dominates regulator and public concerns. They show this issue has significantly undermined trust in the Navy, and stakeholders are frustrated by the Navy delays and want more communication and transparency. This document should address the issue up front beginning with the Executive Summary and throughout the entire document wherever relevant. Below are examples:	The Navy acknowledges the significant issues related to the previous radiological surveys and remediation. The FYR report briefly summarizes the technical issues related to the radiological work and indicates that corrective actions will be implemented. Consistent with the template provided in EPA guidance, this information is presented in Sections 6, 7, and 8. The Navy has revised select portions of the report to refer readers to appropriate sections where this issue is discussed. See the responses to parts a through g for further information.
			a. Executive Summary: This section should briefly explain the events of the last five years, the current status, and the future plans. Later sections of this document can refer to this explanation. Please include the Navy's commitment that no further transfers of property will occur until the Navy: (1) retests all locations where Tetra Tech EC Inc. performed previous suspect radiological work, and (2) conducts any necessary cleanup to protect public health and meet ROD requirements.	The Executive Summary was revised to briefly describe, consistent with information presented in Section 7, the nature of the radiological data issue and the Navy's commitment to implement corrective actions.
			b. Section 1, Introduction: This section should expand on the Executive Summary discussion of the radiological re-evaluation to give more details. Later sections of this document can refer to this explanation.	Section 1 describes the purpose of the FYR, and outlines the overall organization of the document. Consistent with the template provided in EPA guidance, the introduction does not discuss the review findings, but clearly states that Sections 6, 7, and 8 provide this information. Accordingly, Section 1 was not revised in response to this comment.

[1] Acronyms and abbreviations are summarized at the end of this attachment.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
1 *(cont.)*	--	--	c. Section 3.1, Basis for Taking Action: This section does not include any discussion or analysis of radiological contamination at all. Please add an explanation for the basis for taking action about radiological contamination, including the history of radiological activities on the site, the fraudulent activity confirmed by enforcement actions, the Tetra Tech EC Inc. Internal Investigation resampling that found five locations needing additional remediation, allegations by former workers, and the radiological data evaluation done by the Navy and regulatory agencies.	Consistent with the template provided in EPA guidance, Section 3.1 briefly describes the basis for taking action by identifying the COCs and the exposure pathways that pose a potential risk (that are to be addressed by the RA). Section 3.1 (which was revised slightly for clarity) discusses the various exposure pathways to contaminated media that pose potentially unacceptable risk to human health and the environment, including potential exposure to radiological contamination.
			d. Section 3.2 Response Actions: This section should include the recent actions taken to address community concerns about health impacts (e.g. review of water, air, and perimeter scan monitoring data and the rework that Tetra Tech EC Inc. did in its Internal Investigation). Please note in the text of this section that all prior Tetra Tech EC Inc. radiological data has been called into question and the Navy has stated openly that they can no longer rely on it. Therefore, these data cannot support any conclusions about protectiveness or completeness of the remedy, and we will not have any conclusions on long-term protectiveness or completeness until new data is taken and any required remediation is performed.	Consistent with the template provided in EPA guidance, Section 3.2 briefly describes the scope and role of various actions that led to selecting the final remedies at each HPNS parcel. Supporting tables that are referenced in Section 3.2 detail the RAOs for the various remedy components at each HPNS parcel. Section 3.3 (not Section 3.2) briefly summarizes the implementation status of the selected remedies at each HPNS parcel, including brief statements regarding the status of radiological remediation at Parcels B-1, B-2, C, D-2, E, G, UC-1, UC-2, and UC-3. Section 3.2 was not revised in response to this comment.
			e. Section 4, Progress Since Last Review: Please summarize the findings related to Tetra Tech EC Inc. prior work. To the extent this topic duplicates information already provided in earlier sections, the text can make referrals to those earlier sections.	Consistent with the template provided in EPA guidance, Section 4 describes the progress made in addressing follow-up actions identified in the third FYR report. The third FYR report did not identify any follow-up actions related to radiological remediation. Accordingly, Section 4 does not discuss the technical issues related to the radiological work, and was not revised in response to this comment.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
1 *(cont.)*	--	--	f. According to the last paragraph of Section 5.2, "*The Navy has completed an extensive review of the radiological remediation documents and data…and has identified the areas where resurveying for radionuclides is required to address all issues discovered*;" however, the FYR does not identify the areas that require resurveying. The recommendation in Section 7.0 does indicate that Parcels B-1, B-2, C, D-2, G, E, UC-1, UC-2, and UC-3 are affected, but the text does not discuss the extent of rework that will be necessary.	The subject sentence in Section 5.2 was revised to clarify that the areas requiring resurvey are located within Parcels B-1, B-2, C, D-2, E, G, UC-1, UC-2, and UC-3. Section 5.2 was also revised to note that Section 6.1.6 details the Navy's findings regarding the radiological surveys and remediation.
			g. It is unclear how the radiological data issue has impacted the protectiveness determinations for each parcel, because the protectiveness determinations included in the subsections of Section 8.0 are not consistent with the guidelines outlined in the EPA document Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five Year Reviews, OSWER 9200.2-111 (the Protectiveness Guidance), dated September 2012. Please revise the FYR to clarify the extent of radiological rework and the impact of the radiological data issue on protectiveness. EPA will be happy to meet with you to review the factors impacting the protectiveness determinations at each parcel to ensure that the proper protectiveness determinations are made for each parcel in the final FYR.	Section 8 was revised to clarify the protectiveness statements regarding radiological remediation.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
2	--	6.2.2	Section 6.2.2, Changes in Toxicity and Other Contaminant Characteristics: EPA Guidance calls for evaluation of the significance of changes in toxicity values and other contaminant characteristics when conducting a Five-Year Review. The EPA's Preliminary Remediation Goal (PRG) Calculators for soil, the Building PRG Calculator for buildings, and the Surface PRG Calculator for surfaces, "which are used to develop risk-based PRGs for radionuclides, are recommended by EPA for Superfund remedial radiation risk assessments." Here is a link to lists, by date, of the changes in these calculators over the past 5 years: https://epa-prgs.ornl.gov/radionuclides/whatsnew.html. EPA has previously commented that this fourth FYR should include updated risk evaluations for existing remediation goals (RGs) using the current versions of the EPA's PRG Calculators, but this is not addressed in the FYR. For example, risk should be calculated for soil, buildings, piers, and bollards. Please revise the FYR to include the results of updated risk evaluations for existing RGs using the current versions of the EPA's PRG calculators to ensure that existing RGs remain protective. In performing the new evaluation please also keep in mind the following: a. Excerpts from EPA Guidance: i. "cleanup levels not based on an ARAR should be based on the carcinogenic risk range (generally 10^-4 to 10^-6, with 10^-6 as the point of departure and 1 x 10^-6 used for PRGs." ii. "Consistent with existing Agency guidance for the CERCLA remedial program, EPA generally uses 1 x 10^-4 in making risk management decisions."	Section 6.1.6 was revised to include the following statement regarding future evaluation of radiological data: "*Health physicists from the Navy, in consultation with health physicists from the regulatory agencies, will evaluate the additional data collected (during retesting) using current guidance to ensure the radiological remedies are protective of human health.*"

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
2 *(cont.)*	--	6.2.2	b. For EPA to sign a Finding of Suitability to Transfer (FOST) for any parcel, the record must also show that the remedy is consistent with the NCP. Please note that if this review shows that the estimate risk is close to 1 X 10^-4, EPA recommends not setting a Remedial Goal too close to this upper bound 10^-4. First, this increases the potential for the combined risk from multiple contaminants of concern found at a single location to exceed the National Contingency Plan (NCP) risk range of 10^-6 to 10^-4. Adding risks from multiple radionuclides of concern found at the same location, even if individual radionuclide concentrations do not exceed the individual thresholds of concern, is consistent with the Unity Rule in the MultiAgency Radiation Survey and Site Investigation Manual (MARSSIM). Second, in general, EPA estimates of risk at a given radionuclide concentration have increased over time. It would be prudent to allow room to accommodate these likely future increases. c. Buildings PRG Calculator Users Guide: i. Hard Surfaces Only - The risk assessment model for dust includes the receptor spending time on hard and soft surfaces. During a September 5, 2018, conference call, the Navy suggested that EPA consider only hard surfaces during the calculation of risk. For the calculation, the Navy suggested that EPA add the time that the receptor would have spent on soft surfaces to the time the receptor spends on hard surfaces. This would give a total time of 16 hours on hard surfaces for child and 16 hours on hard surfaces for adult. Upon researching the current state of the buildings as well as the condition of the areas where radioactive material was used and stored, EPA agreed that only hard surfaces should be considered. In addition, the transfer factor of hard surface (i.e. 0.5) is much greater than the soft surface (i.e. 0.1). This suggests that a receptor is more likely to transfer contamination onto his/her skin from hard surface than a soft surface such as carpet. If the assumption is that all areas within the building is a hard surface and more time is spent on hard surfaces, the risk will increase, creating a more conservative model.	*(please see the response on page 4)*

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
2 *(cont.)*	--	6.2.2	c. Buildings PRG Calculator Users Guide *(continued)*: ii. Hard Surfaces Only - The risk assessment model for dust includes the receptor spending time on hard and soft surfaces. During a September 5, 2018, conference call, the Navy suggested that EPA consider only hard surfaces during the calculation of risk. For the calculation, the Navy suggested that EPA add the time that the receptor would have spent on soft surfaces to the time the receptor spends on hard surfaces. This would give a total time of 16 hours on hard surfaces for child and 16 hours on hard surfaces for adult. Upon researching the current state of the buildings as well as the condition of the areas where radioactive material was used and stored, EPA agreed that only hard surfaces should be considered. In addition, the transfer factor of hard surface (i.e. 0.5) is much greater than the soft surface (i.e. 0.1). This suggests that a receptor is more likely to transfer contamination onto his/her skin from hard surface than a soft surface such as carpet. If the assumption is that all areas within the building is a hard surface and more time is spent on hard surfaces, the risk will increase, creating a more conservative model.	*(please see the response on page 4)*

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
2 *(cont.)*	--	6.2.2	c. Buildings PRG Calculator Users Guide *(continued)*: iii. Changing K to 0.38: The BPRG allows the user to add a dissipation rate to the model. The dissipation rate is described in the User's Guide as follows: "In some circumstances, the load of dust on a contaminated surface, to which receptors are exposed, may decline over time. Dissipation of dust may result from cleaning, and transfer to skin and clothing. Different surfaces may be cleaned at different rates and any dissipation rate used should consider a representative cleaning frequency." Currently, the dissipation rate default for the BPRG calculator is set to 0 yr^{-1}. This assumes that a contaminant reservoir is present. By assuming a non-zero for the dissipation rate, the model suggests that various consistent mechanisms will occur to dissipate the contaminant year after year. Mechanisms for example could include a combination of cleaning, resuspension and dilution with uncontaminated dust. Not having a dissipation factor also ensures that if by chance contamination does get back into the home that recontamination is accounted within the model. The User's Guide also warns users about adding a dissipation rate: "WARNING: Using a dissipation rate constant or changing the value of t should only be done once a complete understanding of the mathematics involved in deriving the equation is gained and the site conditions have been fully investigated." The Navy's dissipation rate suggested was 0.38 yr^{-1}, which comes from a study of the Binghamton State Office Building contaminated with dioxin. If a non-zero dissipation factor is applied to the model, the dissipation rate must be calculated using data from the Hunters Point Naval Shipyard (HPNS). Outside data and studies cannot be applied to HPNS.	*(please see the response on page 4)*

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
2 *(cont.)*	--	6.2.2	c. Buildings PRG Calculator Users Guide *(continued)*: iv. Reducing transfer factors: The fraction transferred from surface to skin used in the BPRG default are 0.5 for hard surfaces and 0.1 for soft surfaces. Since only hard surfaces are being considered, the Navy suggested that the transfer factor for hard surfaces of 0.5 be reduced to 0.2 since "20% removable" is what has been assumed at Hunters Point, and is a national standard as published by EPA ORIA. With extensive research conducted for hard surfaces at the World Trade Center, EPA cannot deviate from the default of 0.5 for hard surfaces. If further studies and/or tests have been conducted at HPNS regarding the percent of removable contamination, EPA may adopt those fractions. d. Radon gas in a building can accumulate without implementation of radon reduction approaches. EPA's Office of Air and Radiation wrote, "Some natural ventilation occurs in all homes. However, once windows, doors and vents are closed, radon concentrations most often return to previous values within about 12 hours. Natural ventilation in any type of home should normally be regarded as only a temporary radon reduction approach because of the following disadvantages: loss of conditioned air and related discomfort; greatly increased costs of conditioning additional outside air; and security concerns."	*(please see the response on page 4)*

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
3	--	--	EPA has previously requested that a re-evaluation of the volatile organic compounds areas requiring institutional controls (VOC ARICs) boundaries at HPNS be conducted as a part of the fourth FYR due to changes in soil gas toxicity criteria and the appropriateness of the attenuation factor used in the Johnson and Ettinger model (JEM) to calculate the Soil Gas Action Levels (SGALs) for the Record of Decision. EPA further requested that an attenuation factor of 0.03 be used in the JEM model in the re-evaluation. Although the FYR acknowledges this as an issue, the re-evaluation is not included in the FYR. Please revise the FYR to include a re-evaluation of VOC ARICs boundaries using 0.03 as the attenuation factor in the JEM.	The report was revised to include new Appendix E, which discusses how the previous estimates for vapor intrusion risk at Parcels B-1, B-2, D-1, G, UC-1, and UC-2 may be impacted by EPA's request. As described in Appendix E, no changes are required (at this time) for the SGALs or ARICs related to VOC vapors (VOC ARICs) to maintain the current protectiveness of the remedies. The Navy will work with the regulatory agencies to resolve concerns regarding protectiveness from vapor intrusion prior to transfer of the property.
4	--	--	Section 6.2.2, Changes in Toxicity and Other Contaminant Characteristics: The Records of Decision (RODs) or Explanations of Significant Differences (ESDs) for some parcels define Tier 1 and/or Tier 2 soil action levels for chemicals for specific circumstances. For example, the Parcel E ROD, the Parcel C ESD, and the Parcel G ESD define Tier 1 and/or Tier 2 action levels that are five times or ten times the Remedial Goals (RGs). The RGs were based on the chemical specific risk-based concentration (RBC), laboratory practical quantitation limit (PQAL), or the Hunters Point ambient level (HPAL). While it does not make sense for the RGs and action levels to be lower than the HPAL or PQAL, if Tier 1 or Tier 2 levels end up mathematically exceeding five times or ten times the RBCs in the new review, this is a situation that warrants further discussion. For example, based on Table 15, the risk from arsenic at the Residential RG (HPAL) is 1.63 x 10-5. Any arsenic concentrations of 68 mg/kg or higher in soil would exceed a risk of 10-4 for residential reuse. Where RGs were based on a PQAL or HPAL, and not an RBC, the FYR should evaluate the Tier 1 and Tier 2 levels to see if they exceed five times or ten times the RBC. If so, then please put this issue on the agenda for a monthly meeting of the Base Closure Team for discussion with regulatory agencies.	EPA's request does not appear to be based on new information that would call into question the protectiveness of the remedy (which, consistent with EPA guidance, is the standard by which such a reevaluation would be necessitated). The subject decision documents identified action levels in soil at parcels where the selected remedy involved focused removal (via excavation and offsite disposal) followed by construction of a durable cover and implementation of ICs (to eliminate the exposure pathway to humans and wildlife). The chemicals for which remediation goals were based on either HPALs or PQLs are limited to metals, SVOCs, and pesticides. For these chemicals, the human health risk is solely attributed to direct exposure pathways (e.g., dermal exposure, incidental ingestion, inhalation of airborne dust, or ingestion of homegrown produce) that will be eliminated through the proper maintenance of durable covers and implementation of ICs. Accordingly, the requested evaluation is not needed to demonstrate the protectiveness of the remedy, and no change was made in response to this comment. The Navy is willing to discuss this issue with the regulatory agencies at future BCT meetings.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
5	--	--	The FYR does not include an Institutional Controls Summary Table in Section 3, Response Action Summary, as indicated by the EPA 2016 Five Year Review Recommended Template, OLEM 9200.0.89 (EPA 2016 FYR Template). Please revise Section 3 to include an Institutional Controls Summary Table.	The FYR report was revised to add a new table summarizing the ICs at various HPNS parcels.
6	--	--	There are numerous inconsistencies in the FYR. For example, in Section 6.3 Question C, the FYR only identified atmospheric warming as a potential issue that may call into question the protectiveness of the remedy. However, in Section 7, Issues, Recommendation, and Other Findings, radiological rework is also identified as an issue that may call into question the protectiveness of the remedy. Please review the FYR for consistency and revise accordingly.	The FYR report was reviewed and revised, as appropriate, to ensure that information in Section 6 (Technical Assessment) is consistent with all related statements in Sections 7 and 8. Consistent with EPA guidance, Section 6.3 focuses on "other information" (i.e., information that is not already discussed in Sections 6.1 and 6.2) that could call into question the protectiveness of the remedy. However, to further clarify the text, Section 6.3 was revised to include a reference to Section 6.1.6, where the issue related to the radiological remediation was discussed.
7	--	--	The FYR indicates that Parcel A is not included in the FYR because the parcel required no action under CERCLA. Although Parcel A was clean-transferred to the City and County of San Francisco, CDPH is conducting additional radiological surveys at Parcel A to address community concerns. To date, at least one radiological anomaly associated with Navy activity, a deck marker, has been identified and removed from Parcel A. Please revise the FYR to acknowledge community concerns, the cause of the community's concerns, the ongoing investigation by CDPH, and the potential for the Navy to conduct additional actions at Parcel A if CERCLA related issues are identified as a part of the CDPH investigation.	The Navy is aware of CDPH's ongoing surveys at former Parcel A, and will support the necessary follow-up actions in response to their findings. The recent discovery (on September 7, 2018) of a radiological device is being thoroughly investigated and, following completion of CDPH's scan at former Parcel A, the Navy will consult with the regulatory agencies before deciding on the appropriate course of action to ensure the Navy properly implements its responsibilities under CERCLA Section 120. The FYR report was not revised to discuss ongoing activities at former Parcel A.
8	--	--	One removal action, the 1988 Basewide Removal of PCB [polychlorinated biphenyls]-Containing Transformers is only included in Table 10 for Parcel E; however, this action should also be included in the pre-Record of Decision (ROD) action tables for Parcels B, C, and D (Tables 2, 4, and 7). Please revise the pre-ROD action tables for Parcels B, C, and D to include the 1988 Basewide Removal of PCB-Containing Transformers.	The subject activity was not a CERCLA removal action but was performed between 1987 and 1998 as part of maintenance throughout HPNS. Accordingly, Section 3.2 (which summarizes basewide activities) was revised to include a brief summary of this activity, and Table 10 (which summarizes activities specific to Parcel E) was revised to delete this activity.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
9	--	--	The FYR does not address some of the concerns expressed during the interview process. For example, one of the Regulatory Agency Interview Records in Appendix B1 asks the Navy to "address in the Five-Year Review the steps the Navy has already taken and will take in the future to improve contractor oversight." Similarly, the Community Member Survey Records in Appendix B2 ask for feedback regarding how the Navy can communicate better with the local community, but the FYR does not include any recommendations to improve communication with the community. Please ensure the requests and concerns identified during the interview process are addressed in the main text of the FYR.	Consistent with the template provided in EPA guidance, Section 5.1 briefly describes community involvement activities and site interviews that were conducted as part of the FYR review, and Sections 6, 7, and 8 incorporate input from those efforts as they relate to the protectiveness of the completed remedies. Accordingly, the FYR report focuses on technical concerns (e.g., the adequacy of the radiological remediation) and does not discuss peripheral issues related to future remedy implementation. In implementing the cleanup program at HPNS, the Navy is committed to meaningful community involvement and careful oversight of its contractors. The Navy provides regular updates to the regulatory agencies and community members and believes that this is the most effective means of communication. No revisions were made in response to this comment.
10	--	--	Section 8.0 does not include protectiveness determinations for Parcel E or Parcel E-2. While it is understood that the remedies are not complete for Parcels E and E-2, the Protectiveness Guidance includes information to assist in determining protectiveness if the remedies are not yet complete. Please revise Section 8.0 to include protectiveness determinations for Parcel E and Parcel E-2.	Section 8 was revised to include protectiveness statements for Parcels E and E-2.
11	--	--	There are several uncertainties related to the observations made during the site inspections. These include, but are not limited to the following: a. Section 5.3 states that minor holes were observed at Installation Restoration Site (IR)-07/18, but these holes did not impact the effectiveness of the soil cover; however, it is unclear whether these holes will continue to be monitored in the future to ensure they do not expand (i.e. it is unclear whether the operations and maintenance contractor is aware of the holes). In addition, the FYR does not include a figure depicting the location(s) of the holes.	Section 5.3 was clarified, as appropriate, to address the concerns identified below. Section 3.3.1.2 identifies the ongoing maintenance activities associated with the soil cover at IR-07/18, which include identifying and repairing areas with noticeable erosion. Section 5.3 was revised to clarify that regular inspections and maintenance are performed to address the noted issues. The Navy prepares annual reports detailing the inspection and maintenance activities, and no further detail is needed to support the technical assessment provided in the FYR report.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
11 *(cont.)*	--	--	b. According to Section 5.3, there was "minor damage caused by weed growth at seams in the asphalt cover" at Parcel B-1, as well as at Parcels C and G; however, it is unclear whether weed control will be implemented to prevent additional damage to the seams. In addition, the FYR does not include a figure depicting the location(s) of the weed concerns at Parcels B-1, C and G.	Sections 3.3.3.2 and 3.3.9.2 identify the ongoing maintenance activities associated with the durable covers at Parcels C and G, which include identifying and repairing areas with noticeable cracks or holes. Section 5.3 was revised to clarify that regular inspections and maintenance are performed to address the noted issues. The Navy prepares annual reports detailing the inspection and maintenance activities, and no further detail is needed to support the technical assessment provided in the FYR report.
			c. The second to last paragraph of Section 5.3 states that "The newly installed asphalt cover in Parcel UC-3 was observed to be in good condition, with only minor damage caused by frequent traffic on the roadway surface;" however, it is unclear why evidence of damage was observed and whether there are any actions that could be taken to minimize damage to the asphalt cap. In addition, it is unclear why there is already damage to a newly installed asphalt cover, which could lead to concerns regarding the longevity of the asphalt cover at Parcel UC-3. Lastly, the FYR does not include a figure depicting the location(s) of asphalt damage at Parcel UC-3.	Parcel UC-3 is an active roadway that serves as the primary access route to and from Navy-owned property. Similar to conditions encountered at Parcels UC-1 and UC-2 (which formerly served as the primary access route), regular maintenance will be required to address minor damage that is typical for roadways with significant traffic use (including frequent use by large trucks). Sections 3.3.11 and 5.3 were revised to discuss the status of the O&M program at Parcel UC-3 and the planned repairs to address the noted deficiencies. No further detail is needed to support the technical assessment provided in the FYR report.
			d. According to the last paragraph of Section 5.3, "Monitoring well surface completions observed during the site inspections were found to be in good condition," but the text does not indicate whether locks were present and secure on the well heads and if all wells were marked/labeled. In addition, there is no summary of the condition of the Soil Vapor Extraction (SVE) systems and associated extraction wells present at Parcel C. Please revise the FYR to provide additional information regarding the observations made during the site inspections.	Section 5.3 was revised for clarify as follows: "*The interior of each ~~M~~ monitoring wells ~~is are~~ regularly inspected during the semiannual groundwater sampling events, and includes inspection of the condition of well casings, lids, locking caps, and labels. Any damage that affects the integrity of the monitoring well is repaired in a timely manner. Semiannual groundwater monitoring reports summarize the condition of the monitoring wells and describe maintenance actions (as appropriate). Based on a review of the most recent semiannual groundwater monitoring reports, the interior of each well ~~and were~~ was generally observed to be in good condition.*" SVE wells and equipment are operated at Parcels B-1 and C as part of the RA implementation, and are not part of an LTM program that requires regular reporting.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
12	--	--	None of the parcel-specific figures depict the past or current groundwater plume extents. This information is required to demonstrate remedy progress. Depiction of plume extents is important for evaluation of Question A, which evaluates remedy performance (i.e., the text should not just discuss what actions were taken, but whether these remedy actions have been effective). Please revise the FYR to include figures depicting the past and current groundwater plume extents and include an evaluation of progress in addressing groundwater plumes in the text discussing Question A.	The figures presented in the FYR report focus on completed remedy components that directly pertain to the technical assessments provided in Section 6. Given the large scale of the RAs at HPNS, it is difficult to detail all completed and ongoing remedy components and this information is provided in various reports prepared by the Navy and submitted to the regulatory agencies for review. Regarding the evaluation of groundwater plume extent, the Navy wishes to clarify that the VOC plumes are the only such groundwater areas of concern that may warrant an evaluation of contaminant degradation and plume movement. This evaluation was not included in the FYR report because of the following reasons: • As stated in Tables 3, 5, 6, 8, and 9, the RAOs pertaining to exposure to VOC vapors emanating from groundwater are superseded by action levels established for soil vapor (i.e., SGALs). • As described in Section 6.2.3, the required actions if SGALs are exceeded include ICs (e.g., access limitations) or engineering controls (such as a vapor barrier) and would not necessarily prompt additional remediation. • As described in Appendix E (added in response to EPA general comment 3), no changes are required (at this time) for the SGALs or VOC ARICs to maintain the current protectiveness of the remedies. The Navy will work with the regulatory agencies to resolve concerns regarding protectiveness from vapor intrusion prior to transfer of the property. Based on the reasons stated above, the Navy does not believe that an evaluation of the VOC plume extent is required to support the technical assessments provided in Section 6. No revisions were made in response to this comment.

Table 1. Responses to Comments from the EPA[1] Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
General comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
13	--	--	Some of the remedy components discussed in the text of the FYR are not depicted on the parcel-specific figures. Examples include, but are not limited to the following: a. Figure 6 does not depict the location(s) of the in-situ groundwater treatment areas or the soil hot spot removals at Parcel C. b. Figure 7 does not depict the location(s) of the in-situ groundwater treatment or the soil hot spot removals for Parcel D-1. c. Figures 8 and 9 depict remedy components for Parcels E and E-2, respectively, but these figures should distinguish between remedy components that have been implemented and remedy components that are still in progress since many remedy components have yet to be implemented. In addition, the title of Figure 9 references Parcel E, but should reference Parcel E-2. d. Figure 10 does not depict the location(s) of the in-situ groundwater treatment areas or the soil hot spot removals at Parcel G. Please revise the parcel-specific figures to depict all the applicable remedy components for each parcel. Alternatively, if the parcel-specific figures will become too cluttered, please add additional figures to depict applicable remedy.	The figures presented in the FYR report focus on completed remedy components that directly pertain to the technical assessments provided in Section 6. Given the large scale of the RAs at HPNS, it is difficult to detail all completed and ongoing remedy components and this information is provided in various reports prepared by the Navy and submitted to the regulatory agencies for review. For these reasons, the figures were not revised to identify the soil hot spot removals at Parcels C and D-1, but limited revisions were made to depict groundwater treatment areas. Figure 6 was revised to identify the groundwater treatment areas at Parcel C. Figures 7 and 10 were not revised to identify the groundwater treatment areas at Parcels D-1 and G because, as described in Sections 3.3.4 and 3.3.9, this activity was performed under a pre-ROD treatability study and no further groundwater treatment was required during RA implementation. Figure 8 was not revised based on this comment because, as stated in Section 3.3.6.1, RA construction at Parcel E has yet to begin. Figure 9 was revised to correctly refer to the remedy components at Parcel E-2. No further revisions were made to Figure 9 because, as stated in Section 3.3.7.1, nearly all of the permanent components of the Parcel E-2 remedy (that are depicted on Figure 9) are either still being constructed or have yet to be initiated.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
1	1-1	1.0	Section 1.0 states that "This fourth five-year review was conducted for all parcels at HPNS (except Parcel A);" however, Parcel F is also not evaluated on this FYR because the ROD has not been completed. In addition, Section 1.0 does not identify who conducted the review and when it was conducted. Please revise Section 1.0 to clarify that Parcel F is also not evaluated in the FYR. Please also revise Section 1.0 to identify who conducted the review and when it was conducted.	Section 1 was revised to explain that Parcel F was not evaluated because the ROD has not been completed. Section 1 was also revised to identify the reviewers and review period as follows: "*The review was conducted, by Navy personnel and their contractor representatives, from December 2017 through November 2018.*" This information is also provided in the Executive Summary.
2	3-5	3.2.4	The description of the Parcel E-2 ROD requirements in Section 3.2.4 is too generic. This parcel differs from the others because it contains a landfill. While it is understood that the specific components are included in Table 12, Section 3.2.4 should better describe requirements to address the Parcel E-2 landfill, including wetland mitigation. Please revise Section 3.2.4 to better describe requirements for addressing the Parcel E-2 landfill, including wetland mitigation.	Consistent with the template provided in EPA guidance, Sections 3.2.1 through 3.2.5 provide a consistent (albeit brief) description of the various actions that led to selecting the final remedies at each HPNS parcel. Supporting tables that are referenced in Section 3.2 detail the RAOs for the various remedy components at each HPNS parcel. Section 3.3 (not Section 3.2) briefly summarizes the various components of the selected remedies at each HPNS parcel and describes their implementation status. Section 3.3.7.1 describes the remedy components at Parcel E-2 and was revised to clarify that the new wetlands are being constructed to offset the loss of wetlands at Parcel E-2 and other areas at HPNS.
3	3-9	3.3.1.2	According to the first paragraph on page 3-9, "The annual inspection event was conducted in April 2016 during the fifth year of LTM [long-term monitoring] and maintenance, but was not formally documented;" however, the text does not explain why there was no formal documentation of the 2016 annual inspection event. In addition, future annual inspections need to be formally documented to support the future FYRs. Please revise Section 3.3.1.2 to explain why there was no formal documentation of the 2016 annual inspection event. Please also ensure future annual inspections are formally documented.	Section 3.3.1.2 was revised to better explain the interruption in the O&M program that occurred in 2015 and 2016. The Navy was in the process of establishing a new O&M contract during this time, so it was only able to perform informal inspections of the sites to identify any critical maintenance or repair items required to avoid compromising the integrity of the remedy. These inspections did not identify any critical or urgent maintenance or repairs items, so no work was performed at the sites during this period. Because there is no documentation for that time period, the Navy cannot issue formal documentation of the inspections. The Navy has since issued a contract to an O&M contractor to perform inspections and maintenance on schedule and to document the inspections and repairs in formal reports.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
4	3-10	3.3.1.2	Further information should be provided about the exceedance of the lead RG in groundwater. The Groundwater Monitoring discussion states that "lead concentrations exceeded the RG of 14.44 micrograms per liter (µg/L) during one sampling event (September 2017)" and that this result "is the first time lead concentrations have exceeded the RG in the past 10 years." However, the text does not discuss the potential cause of the increased lead concentrations or indicate whether any additional investigation or action is needed. Please revise the text to discuss the potential cause(s) of the increased lead concentrations and to indicate whether any additional investigation or action is needed regarding lead in groundwater.	Lead in A-aquifer groundwater is not a new COC. Lead and other metals (including chromium VI, copper, mercury, nickel, and selenium) have historically been detected in A-aquifer groundwater at IR-07/18 and pose a potential risk to aquatic life in San Francisco Bay. The RAMP for IR-07/18 specifies monitoring of two wells in IR-07, and metals concentrations are compared against trigger levels. As noted in Section 3.3.1.2, lead concentrations exceeded the trigger level in September 2017 for the first time in 10 years. Section 3.3.1.2 was revised to clarify that, in accordance with the RAMP, the sporadic nature of this exceedance does not warrant any immediate action, but the Navy will continue monitoring for lead in A-aquifer groundwater and will evaluate concentration trends in future monitoring reports.
5	3-11	3.3.2.1	Section 3.3.2.1 states that injections were performed in 2013 and that "post-injection groundwater monitoring is ongoing," but does not indicate how frequently post-injection monitoring is conducted, for how long post-injection monitoring will continue, or the outcome of the monitoring (i.e., whether injections were successful at reducing concentrations, if additional injections are needed due to concentration rebound, or if insufficient information is available). More than five years have passed since injections were performed, so the FYR should discuss whether injections have been successful. Please revise Section 3.3.2.1 to indicate how frequently post-injection monitoring is conducted, how long post-injection monitoring will continue, and to summarize the outcome of the post-injection monitoring.	Section 3.3.2.1 describes the RA implementation, while Section 3.3.2.2 briefly describes the groundwater monitoring activities. The subject text in Section 3.3.2.1 was revised to refer specifically to Section 3.3.2.2. In addition, Section 3.3.2.2 was revised to describe the current monitoring frequency. The existing text in Section 3.3.2.2 states that post-injection monitoring results "*indicate an overall reduction in the concentrations of TCE over time, but more data collection is required to make any definitive determinations about long-term TCE concentration trends.*" The Navy does not believe that any additional information is required in this FYR report for the reasons provided in the response to EPA General Comment 12.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
6	3-12 8-1,2	3.3.2.1 8.3	According to Section 3.3.2.1, in-situ treatment of mercury using a stabilizing agent is currently underway at Parcel B-2 to minimize migration of mercury in groundwater to the bay; however, given that the actions to address mercury are still in progress and mercury is still present above trigger levels, it is unclear how protectiveness is impacted. Section 8.3 includes multiple statements regarding protectiveness at Parcel B-2, including: • "The remedies completed to date for Parcel B-2 are protective of human health and the environment;" and • Stabilization of mercury in soil "will be protective of the environment." A single protectiveness determination should be provided for each applicable medium at Parcel B-2 and the protectiveness statement should be consistent with the guidelines outlined in the Protectiveness Guidance. Please revise the protectiveness statement for Parcel B-2 in Section 8.3 to include a single protectiveness determination and to be consistent with the guidelines outlined in the Protectiveness Guidance.	The protectiveness statements in Section 8.3 were revised to be consistent with other sections in the report (most notably Sections 3.3.2.1 and 3.3.2.2) and with EPA guidance.
7	3-13	3.3.2.2	Section 3.3.2.2 does not discuss the damage to the Parcel B-1 durable cover due to a major water line leak. Please revise Section 3.3.2.2 to discuss the water line leak and the resulting damage to the durable cover.	Section 3.3.2.2 was revised to discuss the water line leak and the associated repairs that were made (in accordance with the approved O&M Plan) and documented in a subsequent report.
8	3-14	3.3.2.2	The Groundwater Monitoring discussion of Section 3.3.2.2 states an investigation for per- and polyfluoroalkyl substances (PFAS) was conducted at IR-10 "as a result of historical uses," but does not summarize the historical uses for this site. In addition, it is unclear whether there are any other sites at Hunters Point that require investigation for PFAS. Please revise Section 3.3.2.2 to summarize the historical uses for IR-10 related to PFAS. Please also revise the FYR to indicate whether there are any other sites at Hunters Point that require investigation for PFAS.	Section 3.3.2.2 was revised to include the following clarifying statement: "*IR-10 was one of two sites at HPNS (along with IR-09 in Parcel G; see Section 3.3.9.2) with past uses (i.e., metal finishing) that indicated the potential for PFAS to be present in groundwater.*" Section 3.3.9.2, which describes PFAS sampling at IR-09 in Parcel G, was revised in a similar manner. Additional information on the evaluation methodology is provided in the 2018 technical memorandum, which was reviewed by the regulatory agencies.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
9	3-15 Fig 6	3.3.3.1	The text at the bottom of page 3-15 states that "Construction and operation of five SVE systems within Remedial Unit (RU)-C1, RU-C2, RU-C4, and RU-C5 began in 2013," but Figure 6 shows eight SVE areas within these RUs and does not identify which areas currently have SVE systems (e.g., Areas 2, 4, and 5 do not have SVE systems yet per the text). In addition, Section 3.3.3.1 states that "System operation has not yet been performed at Areas 2, 4, and 5," but does not estimate when SVE will be conducted at these areas. Please revise Figure 6 to distinguish between areas with SVE and areas that have not yet had SVE operations implemented. Please also revise Section 3.3.3.1 to indicate when SVE operations are planned for Areas 2, 4, and 5.	Figure 6 was revised to clarify that an SVE system has not yet been installed at Area 2, but that systems have been installed at Areas, 4 and 5. In addition, Sections 6.1.3 and 8.4 were revised to clarify that SVE treatment at Area 2 is pending implementation of other RA activities to address soil and groundwater contamination. The Navy is unable at this time to specify a schedule for installing an SVE system at Area 2. Also, as discussed in Sections 6.1.3 and 7, the SVE technology needs to be closely evaluated for each treatment area due to inefficiency caused by diffusion-limited conditions. Accordingly, Section 8.4 was revised to state: "*The Navy is currently evaluating the proposed SVE operations plans in conjunction with the proposed soil excavation and groundwater treatment plans for these areas and will be issuing a report describing the proposed paths forward.*"
10	3-17	3.3.3.1	Section 3.3.3.1 states that several injections occurred between 2014 and 2017 and that "Post-injection groundwater monitoring is currently being performed under the BGMP [Basewide Groundwater Monitoring Program];" however, the text does not indicate how frequently post-injection monitoring is conducted, how long post-injection monitoring will be required, or when sufficient data will be available to determine the outcome of the injections (i.e., to evaluate whether injections were successful at reducing concentrations or if additional injections are needed due to concentration rebound). Please revise Section 3.3.2.1 to indicate how frequently post-injection monitoring is conducted, how long post-injection monitoring will continue, and when sufficient data will be available to determine the outcome of the injections.	Section 3.3.3.1 describes the RA implementation, while Section 3.3.3.2 briefly describes the groundwater monitoring activities. The subject text in Section 3.3.3.1 was revised to refer specifically to Section 3.3.2.2. In addition, Section 3.3.3.2 was revised to describe the planned performance monitoring at VOC plumes where in-situ treatment has occurred. The existing text in Section 3.3.3.2 states that post-injection monitoring results "*will be summarized in future technical publications.*" There is no additional information that has been published at this time, so no further clarifications were made to the report. Also, as stated in the response to EPA General Comment 12, the RAOs pertaining to exposure to VOC vapors emanating from groundwater are superseded by action levels established for soil vapor (i.e., SGALs), which lessen the importance of evaluating short-term VOC concentration trends in groundwater.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
11	3-18	3.3.3.1	Section 3.3.3.1 should discuss the radiological remediation of Buildings 211 and 253 that will be conducted in the future. While it is understood that the work is still in the planning stages, the text should outline the remediation that will be conducted. Please revise Section 3.3.3.1 to discuss the radiological remediation of Buildings 211 and 253 that will be conducted.	Section 3.3.3.1 was revised as requested.
12	3-19 6-3	3.3.4.1 6.1.2	Section 3.3.4.1 includes construction of durable covers; however, durable covers at Parcel D-1 are not discussed in Section 6.1.2. Please revise Section 6.1.2 to discuss durable covers at Parcel D-1.	Section 6.1.2 was revised to discuss the durable cover construction at Parcel D-1.
13	3-29	3.3.7.2	The Landfill Cap Inspection and Maintenance discussion does not discuss the removal of the interim landfill cap. This cap was removed so that the final cap can be constructed. This is important because once the interim cap was removed, previous inspection and monitoring activities no longer apply. Please revise Section 3.3.7.2 to discuss the removal of the interim landfill cap.	Section 3.3.7.2 was revised for clarity as follows: "*O&M of the interim landfill cap was suspended in 2017, when Phase 2 RA construction began in the area. The Phase 2 RAWP for Parcel E-2 (CB&I Federal Services LLC, 2016b) identifies procedures to be followed during construction to maintain the integrity of the interim landfill cap (which will be integrated into the final cover system to be constructed during the Phase 3 RA).*"
14	3-31 6-5	3.3.9.1 6.1.4	Section 3.3.9.1 includes treatment of volatile organic compounds (VOCs) in groundwater at the IR-71 plume using in-situ bioremediation (ISB) or zero-valent iron (ZVI); however, in-situ groundwater treatment at Parcel G is not discussed in Section 6.1.4. Please revise Section 6.1.4 to discuss in-situ groundwater treatment at Parcel G.	Section 6.1.4 was revised for clarity as follows: "*In-situ groundwater treatment remedies have been implemented in Parcel B-1 (IR-10), ~~and~~ Parcel C (RU-C1, ~~RU-C2,~~ RU-C4, and RU-C5), and Parcel G (IR-09 and IR-71).*"

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
15	3-36 8-3	3.3.10.2 8.8, 8.9	The first paragraph on page 3-36 states that "During preparation of this five-year review, the durable covers in Parcels UC-1 and UC-2 were observed to be severely damaged due to redevelopment construction activities;" however, this status does not appear to be reflected in the protectiveness determinations for these parcels, found in Sections 8.8 and 8.9, respectively. Both Sections 8.8 and 8.9 state that the remedies "are protective of human health and the environment." The Protectiveness Guidance should be used to make protectiveness determinations for Parcels UC-1 and UC-2 that reflect the compromised durable covers during construction activities. Please revise the protectiveness determinations for Parcels UC-1 and UC-2 in Sections 8.8 and 8.9, respectively, to account for the compromised durable covers during construction activities.	Sections 3.3.10.2 and 5.3 both describe the construction activities in Parcels UC-1 and UC-2. Both sections were revised to better explain the following points: • Construction activities were performed in accordance with an approved Risk Management Plan. • Implementation of the procedures in a Risk Management Plan (that, in accordance with the LUC RD, is approved by the FFA signatories) allows for construction activities to be performed in a manner that remains protective of human health and the environment. • The covers could not be inspected in January 2018, but a subsequent inspection verified that the covers have since been restored. Based on the above-listed clarifications, the protectiveness statements in Sections 8.8 and 8.9 do not require revision.
16	3-37 8-4	3.3.11.1 8.10	In regard to VOCs in soil gas near well IR74-MW01A, Section 3.3.11.1 states, "The Navy is evaluating this hazard to determine if it is necessary to designate an ARIC [Area Requiring Institutional Controls] in this area to address future inhalation and other exposure hazards;" however, this ARIC evaluation does not appear to be reflected in the protectiveness determination for Parcel UC-3 in Section 8.10. Section 8.10 states that the remedies at Parcel UC-3 "are protective of human health and the environment." The Protectiveness Guidance should be used to make a protectiveness determination that reflects the uncertainty that remains to be addressed by the ARIC evaluation. Please revise the protectiveness determination for Parcel UC-3 in Section 8.10 to account for the uncertainty that remains to be addressed by the ARIC evaluation.	Section 3.3.11.1 was revised to be consistent with the Final RACR as follows: *"The results of the survey revealed that residual benzene contamination in soil near groundwater well IR74MW01A is generating soil gas that ~~slightly~~ exceeds the designated soil gas action level. Accordingly, t~~T~~he Navy ~~is evaluating this hazard to determine if it is necessary to~~ plans to ~~designate~~ retain an ARIC related to VOC vapors in this area to address future inhalation and other exposure hazards."* In addition, the protectiveness statement in Section 8.10 was revised to be consistent with EPA guidance.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
17	4-1	4.0	Section 4.0 does not include subsections for Parcels E, E-2, or UC-3, so it is unclear whether these parcels were included in the Third FYR. Please revise Section 4.0 to clarify whether Parcels E, E-2, and UC-3 were included in the Third FYR.	Section 4 was revised for clarity as follows: "*The Third Five-Year Review Report did not evaluate Parcels E and UC-3 because the RODs were not complete at the time the report was finalized in November 2013. The Third Five-Year Review Report did not provide a protectiveness statement for Parcel E-2 because the RA activities had not begun. Accordingly, this section focuses only on those areas (i.e., IR-07/18 and Parcels B-1, B-2, C, D-1, D-2, G, UC-1, and UC-2) where RODs were completed and the RA had been initiated at the time the report was finalized in November 2013.*"
18	6-3	6.1.2	Section 6.1.2 states that "the durable covers, as required by the RODs, were implemented properly and are functioning as intended in IR-07/18 and Parcels B-1, B-2, C, G, UC-1, UC-2, and UC-3;" however, this statement is not accurate for Parcels UC-1 and UC-2. Section 3.3.10.2 states that "Parcels UC-1 and UC-2 were observed to be severely damaged due to redevelopment construction activities" and Section 5.3 indicates that the covers at these parcels were not inspected during the site inspection. Please revise Section 6.1.2 to indicate that the durable covers in Parcels UC-1 and UC-2 are not currently functioning as intended, but will be repaired following completion of the construction activities. Please also revise Section 6.1.2 to describe any practices that are in place to prevent exposure at Parcels UC-1 and UC-2 while the durable covers are in disrepair.	Please see the response to EPA Specific Comment 15, which supports the statement at the end of Section 5.3 that the durable cover remedies at all sites were operating properly and successfully. Accordingly, the technical assessment provided in Section 6.1.2 does not require revision.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
19	6-4,5	6.1.3	Section 6.1.3 states that SVE is expected to begin in Areas 4 and 5 of Parcel C in 2018, but does not estimate when SVE will begin for Area 2. In addition, Section 6.1.3 states that the SVE systems are "not operating efficiently to reduce the mass of source contamination in soil" and "[o]ptimization of the existing SVE systems will not significantly improve source mass reduction," but does not specify to which systems this applies (e.g., Parcel B-1, Parcel C, all current SVE systems, etc.) or indicate whether this will impact whether future SVE systems (e.g., Areas 2, 4, and 5 of Parcel C) will be implemented. Lastly, the FYR does not indicate how the RAOs will be achieved if the source mass is not reduced. Please revise Section 6.1.3 to estimate when SVE will begin at Area 2 of Parcel C. Please also revise Section 6.1.3 to identify which SVE systems are not operating effectively and to discuss whether this will impact whether future SVE systems will be implemented. Lastly, please revise the FYR to discuss how the RAOs will be achieved if the source mass is not reduced.	Section 6.1.3 was revised for clarity as follows: "*Treatment in Areas ~~24, and 5~~ is ~~expected to begin in 2018~~ pending implementation of other RA activities to address soil and groundwater contamination.*" In addition, Section 3.3.3.1 was revised to clarify that SVE operations were conducted at Areas 4 and 5. As discussed in Sections 6.1.3 and 7, the SVE technology needs to be closely evaluated for each treatment area due to inefficiency caused by diffusion-limited conditions. Section 6.1.3 was not further clarified because the selected remedies to minimize exposure to VOCs in soil gas include multiple components, including treatment, monitoring, and ICs. Contrary to the statement provided in this comment, the Navy does not believe that an assessment of compliance with the soil gas RAO (to minimize exposure to VOCs in soil gas) can be made solely on the basis of evaluating SVE system performance. Also, as discussed in the response to EPA General Comment 3, the report was revised to include new Appendix E, which discusses how the previous estimates for vapor intrusion risk at Parcels B-1, B-2, D-1, G, UC-1, and UC-2 may be impacted by EPA's request. The Navy will continue to work with the regulatory agencies to resolve concerns regarding protectiveness from vapor intrusion prior to transfer of the property.
20	6-5,6	6.1.4 6.1.5	Section 6.1.4 indicates that the in-situ groundwater remedies are functioning as intended, but does not discuss the stability of groundwater plumes (i.e., whether the extent of each plume is increasing, stable, or decreasing) or the stability of groundwater concentrations (i.e., whether groundwater trends are increasing, stable, or decreasing). Similarly, Section 6.1.5 indicates that the monitored natural attenuation (MNA) groundwater remedies are functioning as intended, but does not discuss the stability of groundwater plumes or of groundwater concentrations. Please revise Sections 6.1.4 and 6.1.5 to provide additional information regarding the performance of the in-situ groundwater remedies and MNA groundwater remedies, respectively.	As stated in the response to EPA General Comment 12, the Navy does not believe that an evaluation of the VOC plume extent is required to support the technical assessments provided in Section 6. Accordingly, Section 6.1.4 was not revised in response to this comment. Section 6.1.5 was revised to explain why an evaluation of MNA at the VOC plumes is not required as part of the technical assessment (based on the reasons stated in the response to EPA General Comment 12), and to provide a more clear assessment of LTM at areas with dissolved metals in groundwater.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
21	6-7	6.1.6	The bullet points under Section 6.1.6 indicate that the radiological remedies have been successfully completed and are functioning as intended at IR-07/18 and Parcel D-1; however, it is unclear whether these remedies were determined to be functioning as intended because the Navy found no evidence of compromised radiological data for these areas or if this work was done by a different entity. The text should state why these radiological remedies are functioning as intended. Please revise Section 6.1.6 to clearly indicate whether the radiological remedies for IR-07/18 and Parcel D-1 were determined to be free of compromised radiological data.	Section 6.1.6 accurately describes the published reports for IR-07/18 and Parcel D-1 that demonstrate the radiological remedy was properly implemented. Section 6.1.6 was not revised in response to this comment.
22	6-7,8	6.1.6	The System O&M [Operations and Maintenance] discussion states that "O&M is not applicable to the completed radiological remedies in Parcel D-1, because this parcel has been radiologically released;" however, this is not consistent with the second to last paragraph of Section 6.1.6, which states that "ICs [institutional controls] for radionuclides are applicable to a portion of Parcel D-1, as this area was not released by the Phase 1 and Phase 2 TCRAs [time-critical removal actions]." Please revise Section 6.1.6 to resolve this discrepancy.	Section 6.1.6 was revised to describe the status of the O&M program at Parcel D-1 (consistent with revisions made to Section 3.3.4.2 and 6.1.2). Section 6.1.6 was also revised to more accurately describe the status of the LUC RD amendment, which the Navy is currently preparing to evaluate ICs for radionuclides at a portion of Parcel D-1.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
23	6-9	6.2.2	This section defines "ambient" level as "naturally occurring chemicals." However, "ambient" levels could also include anthropogenic sources that are not due to Navy contamination, e.g. lead in dust from roads nearby. Also, please recall that the Parcel G ROD, for example, stated "The Navy acknowledges that industrial sources of metals exist at HPS and that there is a potential that some concentrations of metals could have sources other than naturally occurring materials. The Navy has worked to remove these sources during the response actions taken to date. The Navy further acknowledges that the regulatory agencies do not agree with the Navy's position that ubiquitous metals are naturally occurring." Similar language appears in the Parcel G ESD, Parcel B ROD, etc. Please adjust the definition in the FYR to be more complete.	The subject text in Section 6.2.2 was revised for clarity as follows: "*The RGs established in the ROD for the primary risk drivers in soil and groundwater at Parcels B, C, D-1, G, UC-1, UC-2, and UC-3 were selected based on a comparison of the COC-specific risk-based concentration (RBC), the laboratory practical quantitation limit (PQL) based on standard EPA analytical methods, and the Hunters Point ambient level (HPAL) for a broad group of metals ~~naturally occurring chemicals~~.*" This statement is consistent with previous RODs, and the Navy does not believe that any further clarification is needed.
24	6-14	6.2.4	According to Section 6.2.4, "The feasibility assessment concluded that current site conditions are appropriate for residential use in most of Parcel G" and "An ESD [Explanation of Significant Differences] to the Final ROD was prepared to document the reduction in the areas requiring residential land use restrictions, based on the recommendations of the feasibility assessment;" however, it is unclear whether the reduction in the areas requiring residential land use restrictions is impacted the by issues related to potential contractor manipulation and/or falsification of radiological data at Hunters Point. If the feasibility assessment was based in part on impacted radiological data, then this should be stated in Section 6.2.4. Please revise Section 6.2.4 to clarify whether the feasibility assessment for residential use conducted at Parcel G used any impacted radiological data.	The ESD for Parcel G was not related to radionuclides and was developed based on the assumption that the Navy's radiological remediation program would support an unrestricted radiological release of Parcel G. As described in Sections 6.1.6 and 7, the Navy's planned corrective actions are intended to demonstrate that the radiological remedies specified in the RODs (which include unrestricted radiological release of Parcel G) are implemented as intended. No revision was made in response to this comment.
25	7-1	7.0	In accordance with the EPA 2016 FYR Template, please revise the FYR to include IR 07/18 as a site without issues and recommendations.	Section 7 was revised to include the following clarification: "*Issues were identified at all HPNS parcels, except for IR-07/18 and Parcel E-2, with complete or partially complete remedies.*"

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
26	7-1	7.0	Section 7.0 indicates that the SVE implementation in Parcels B-1 and C has limited effectiveness due to diffusion-limited conditions in the subsurface and recommends that the use of the SVE technology be evaluated for each treatment area. Yet, the FYR also concluded that the limited SVE effectiveness does not affect future protectiveness. Diffusion limiting conditions in the subsurface can impact remedy effectiveness and therefore future protectiveness. Please revise the FYR to indicate that limited SVE system effectiveness may affect future protectiveness.	As described in the response to EPA Specific Comment 19, the selected remedies to minimize exposure to VOCs in soil gas include multiple components, including treatment, monitoring, and ICs. Section 7 accurately describes the Navy's evaluation of future protectiveness, as follows: "*Although ICs will maintain future protectiveness, source removal inefficiency is extending the period within which SVE will be implemented.*" Section 7 also recommends that "*Site-specific studies (e.g., remedy analyses) should be performed to estimate the magnitude and extent of source mass at each treatment area in Parcels B-1 and C to determine if other measures could be implemented to enhance SVE performance in the future.*" The Navy believes that these statements adequately supports the protectiveness determination, and no revisions were made in response to this comment.
27	7-2	7.0	Section 7.0 indicates that the issue related to radiological data quality does not affect current protectiveness, but it is not clear why current protectiveness is not a concern. In addition, Section 7.0 also indicates that the Navy plans to resolve this issue by November 1, 2023, but it is unclear why five years are necessary to complete this corrective action. Please revise Section 7.0 to clarify why the identified issue does not impact current protectiveness and re-evaluate the milestone date.	Section 6 provides information to support the recommendations in Section 7 and the protectiveness statements in Section 8. Section 6.1.6 was revised, as follows, to better explain how the radiological remedies are currently protective: "*While the corrective actions are implemented, controls remain in place to prevent exposure to potential radiological contaminants in structures and soil. Overall access to HPNS is restricted by manned, restricted-access checkpoints. Access to most sites and parcels is additionally controlled by fencing and signs at the site. In addition, access is restricted to structures where radiological remediation is incomplete. Lastly, durable covers (as discussed in Section 6.1.2) are in place and are being maintained to prevent potential exposure to remaining chemicals in soil.*" The November 2023 milestone date aligns with the completion of the next FYR, and represents a conservative estimate for resolution of this issue. The Navy is committed to properly implementing the corrective actions and is working with the regulatory agencies to plan and execute the actions in a timely manner.

Table 1. Responses to Comments from EPA Region 9 on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Specific comments provided by EPA Region 9 Remedial Project Manager (Lily Lee), dated September 21, 2018				
28	8-1,4	8.0	In accordance to the Protectiveness Guidance, for remedies with issues that do not effect current protectiveness yet requires more actions to determine long term protectiveness, the corrective protectiveness statement should be "The remedy at Parcel (fill in parcel identification) currently protects human health and the environment because (describe the elements of the remedy that protect human health and the environment in the short-term). However, in order for the remedy to be protective in the long-term, the following actions need to be taken (describe the actions needed) to ensure protectiveness."	The protectiveness statements in Section 8 were revised to be consistent with EPA guidance.
29	8-2	8.4	Section 8.4 includes multiple statements regarding the protectiveness at Parcel C, including the following: a. "The remedies completed to date for Parcel C are protective of human health and the environment;" and b. Additional groundwater treatment "is currently underway and expected to be protective in the future;" and c. "Operation of the SVE system at Areas 1, 3, 6, 7, and 8, is ongoing and ICs will be relied upon in the future to protect human health." A single protectiveness determination should be provided for each of the applicable media at Parcel C and the protectiveness statement should be consistent with the guidelines outlined in the Protectiveness Guidance. Please revise the protectiveness statement for Parcel C in Section 8.4 to include a single protectiveness determination and to be consistent with the guidelines outlined in the Protectiveness Guidance.	The protectiveness statements in Section 8 were revised to be consistent with EPA guidance.
30	--	Table 10	Table 10 is missing the Metal Slag Area Removal Action, which occurred during the same time frame as the Metal Debris Reef Removal Action. Please revise Table 10 to include the Metal Slag Area Removal Action.	Table 10 was revised as requested.

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
1	2-3, 2nd ¶	2.4	The report refers to groundwater levels only in relation to depth from the ground surface. Please add groundwater elevations in relation to mean sea level (1988 North American Vertical Datum [NAVD88]).	Section 2.4 was revised to cite a range of A-aquifer groundwater elevations as provided in the 2017 groundwater monitoring report. The monitoring program reports groundwater elevations relative to the 1929 National Geodetic Vertical Datum, similar to other environmental restoration projects at HPNS.
2	3-7, 1st ¶	3.3.1.1	The Report indicates that radiologically impacted soil at IR-07/18 was remediated to ensure a "*cleared surface prior to placement of the cover.*" Please clarify if the soil was removed, remediated in place, or if some other action was taken.	The subject sentence in Section 3.3.1.1 was revised for clarity as follows: "*The Navy completed a Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Class 1 survey of the entire surface of IR-07/18, and the top 1 foot was remediated in place to levels specified in the Amended ROD (Navy, 2009a) to ensure a radiologically cleared surface prior to placement of the final cover.*"
3	3-9, 1st ¶	3.3.1.2	The Report states there is no formal documentation on the 2016 inspection and maintenance activities. If possible, please formalize documentation of the 2016 inspection. In the future, please be certain to complete and maintain this documentation to verify these activities.	Section 3.3.1.2 was revised to better explain the interruption in the O&M program that occurred in 2015 and 2016. The Navy was in the process of establishing a new O&M contract during this time, so it was only able to perform informal inspections of the sites to identify any critical maintenance or repair items required to avoid compromising the integrity of the remedy. The inspections did not identify any critical or urgent maintenance or repairs items, so no work was performed at the sites during this period. Because there is no documentation from that time period, the Navy cannot issue formal documentation of the inspections. The Navy has since issued a contract to an O&M contractor to perform inspections and maintenance on schedule and to document the inspections and repairs in formal reports.

[2] Acronyms and abbreviations are summarized at the end of this attachment.

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
4	3-11, 8th ¶	3.3.2.1	The Report describes operation of the soil vapor extraction (SVE) system, but does not cite any reports related to volatile organic compound (VOC) removal. Please include citations that support the data in the Report.	Section 3.3.2.1 was revised to refer to the Draft RACR for Parcel B-1, which describes the expansion, commissioning, and operation of the SVE system during the RA construction period. No formal reports have been prepared since the publication of the Draft RACR to document the progress of SVE system operation in IR-10; however, the Navy has been collecting system performance and treatment data since operation resumed in late 2017. Section 3.3.2.1 was also revised to note the Navy's plans to prepare (1) formal progress reports at the end of each operations year to summarize treatment progress and (2) a RACR specific to IR-10 to document the final results of treatment upon completion of remedy implementation.
5	3-12, 2nd ¶	3.3.2.1	The Report describes the implementation of an in situ remediation technology using a polylactate substrate, but does not cite any reports regarding these activities. Please include citations for documentation of the 2013 activities and subsequent monitoring.	Section 3.3.2.1 was revised to refer to the Draft RACR for Parcel B-1, which describes implementation of the polylactate substrate injections performed during the RA construction period. Section 3.3.2.1 was also revised to refer to the most recent semiannual groundwater monitoring report, which details the post-injection monitoring results.
6	3-14, 2nd ¶	3.3.2.2	The Report states there has been an "*overall reduction in concentrations of TCE over time*," but does not provide concentrations or cite reports to support the statement. Please add pre-treatment concentrations and the most recent concentrations to the text in addition to citing documents on this treatment and the continued monitoring.	Section 3.3.2.2 was revised to refer to the most recent semiannual groundwater monitoring report, which presents the trend graphs for all data collected from the IR-10 groundwater plume.
7	3-16, 1st ¶	3.3.3.1	The Report references an "APTIM, 2018" document, which is not included in Appendix A. Please clarify if this "APTIM, 2018" reference is for one of the other documents prepared by APTIM during 2018 or add the appropriate reference to the appendix.	Section 3.3.3.1 was revised to identify the correct reference (which is listed in Appendix A) as "Aptim, 2018b."

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
8	3-17, 1st ¶	3.3.3.1	The Report states that SVE system operation has not been started at Areas 2, 4 and 5, but does not indicate when these systems are planned to be installed and operational. Please add approximate start dates for these SVE systems.	Section 3.3.3.1 was revised to clarify that SVE operations were conducted at Areas 4 and 5. In addition, Sections 6.1.3 and 8.4 were revised to clarify that SVE treatment at Area 2 is pending implementation of other RA activities to address soil and groundwater contamination. The Navy is unable at this time to specify a schedule for installing an SVE system at Area 2. Also, as discussed in Sections 6.1.3 and 7, the SVE technology needs to be closely evaluated for each treatment area due to inefficiency caused by diffusion-limited conditions. Accordingly, Section 8.4 was revised to state: "*The Navy is currently evaluating the proposed SVE operations plans in conjunction with the proposed soil excavation and groundwater treatment plans for these areas and will be issuing a report describing the proposed paths forward.*"
9	3-17, 4th ¶	3.3.3.1	The Report states that "*Groundwater treatment was successfully conducted to achieve source reduction and partially meet RAOs*," but does not provide data or cite reports to support the statement. Please add data to the text to support the statement and reference documents from which those data are sourced.	The subject sentence was deleted because additional data are needed to evaluate remedy performance and the extent to which RAOs have been achieved. Also, as stated in the response to EPA General Comment 12, the RAOs pertaining to exposure to VOC vapors emanating from groundwater are superseded by action levels established for soil vapor (i.e., SGALs), which lessen the importance of evaluating short-term VOC concentration trends in groundwater. Section 3.3.3.1 describes the RA implementation, while Section 3.3.3.2 briefly describes the groundwater monitoring activities. Section 3.3.3.1 was revised to refer specifically to Section 3.3.2.2. In addition, Section 3.3.3.2 was revised to describe the planned performance monitoring at VOC plumes where in-situ treatment has occurred.
10	3-20, 2nd ¶	3.3.4.1	The Report presents details of a pre-Record of Decision (ROD) groundwater treatability study, but no Information is provided regarding the outcome. Please provide details on the effectiveness of the treatability study and clarify if the treatment was continued at the IR-71 West plume.	Section 3.3.4.1 describes the RA implementation, while Section 3.3.4.2 briefly describes the groundwater monitoring activities. The subject text in Section 3.3.4.1 was revised to refer specifically to Section 3.3.4.2.

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
11	3-26, 1st ¶	3.3.6.2	The Report references "Navy, 2013d," which is Incorrect Please correct to "Navy, 2013b." In addition, it is recommended that the references listed in the text be reviewed for accuracy.	The subject text was revised to cite the Final ROD for Parcel E (Navy, 2013e). The references elsewhere in the document were checked for accuracy and revised as necessary.
12	3-29, 1st ¶	3.3.7.2	The Report mentions that active gas extraction was started after a methane exceedance in March 2015, but does not indicate that extraction stopped after March 2015. Please update the Report to specify when the extraction system was operable.	Section 3.3.7.2 was revised to state: "*In response to the March 2015 exceedance, active gas extraction was ~~initiated~~ conducted for approximately 1 week and, in accordance with the MCP, ceased after ~~follow-up~~ two consecutive monitoring events demonstrated that methane concentrations were less than the action level (2.5 percent methane by volume) ~~was performed in accordance with the MCP~~.*"
13	3-30	3.3.8	The Report states that the ROD for Parcel F has not been published. It is recommended that the text state when the ROD is expected to be published.	Section 3.3.8 was revised as follows: "*A ROD for Parcel F has not yet been published, but is expected to be completed in 2019.*"
14	3-36, 1st ¶	3.3.10.2	The Report states that the covers will be restored and maintained after construction activities are completed, but no approximate date is provided. Please update the text to Indicate when nearby construction activities are expected to be complete.	Section 3.3.10.2 was revised to clarify that the covers have been restored since the January 2018 site inspection.
15	4-1, 2nd ¶	4.1	The Report indicates that the Third Five Year Review Report did not present any issues or recommendations. It is recommended that the sentence be amended to specify that no new activities took place based on the lack of issues and recommendations.	Section 4.1 was revised to clarify that the Third FYR Report did not prompt any follow-up actions at IR-07/18. Similar edits were made elsewhere in Section 4 to ensure consistency with Section 4.1.
16	6-15	6.3	The Report states that a sea level elevation increase was considered in the design of the shoreline protection measures at Parcels E and E-2 by adding a 3-foot contingency, but the Report does not state if the current design meets current guidelines. Please revise to clarify if the design meets current guidelines.	Section 6.3 in the FYR report was revised to better explain why the new information related to sea level rise (as provided in the 2018 guidance document) does not call into question the protectiveness of the remedies.

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
17	6-15	6.3	The Report presents three possible scenarios for future sea level rise (SLR), but the scenarios presented are not appropriate for this site. The updated SLR estimates provided in 2018 by the California Ocean Protection Council (OPC) must be used. Additionally, based on this guidance and discussions with the Bay Conservation Development Commission, the appropriate scenarios are the Likely Range (0.66 probability), high emissions at year 2100 (1.6 to 3.4 ft), and the 1 in 200 Chance (0.5 % probability) high emissions for all parcels except Parcel E-2. At Parcel E-2, please refer to the section titled Guidance on How to Select Sea-Level Rise Projections (pages 25-27) for guidance on projections based on project lifespan, location (e.g. near vulnerable communities, coastal habitats), and flexibility to adapt. Please consider including the H++ Scenario (extreme risk aversion) for Parcel E-2 due to the location of the landfill at Parcel E-2.	The Navy has evaluated potential sea level rise when designing shoreline protection structures at Parcels B-1, B-2, E, E-2, and IR-07 and has engaged the regulatory agencies (including DTSC and BCDC) to obtain and incorporate their input throughout the process. The shoreline protection designs, which were reviewed and accepted by the regulatory agencies, provided a reasonable degree of protection from wind-generated waves, extreme high tide events, and future sea level rise. Section 6.3 was revised to better explain the Navy's evaluation of sea level rise estimates. The Navy understands that scientific research regarding sea level rise is an ongoing process, and the Navy will continue to evaluate new research in future FYRs to ensure that shoreline structures meet their design objectives. The shoreline structures can be adapted to increase the crest elevation if deemed necessary based on future evaluations. In the Fourth FYR Report, the Navy evaluated the most current scientific research and verified that no changes to the shoreline protection structures were needed. The response to BCDC's comment 2 (in Table 5) provides further information to support the Navy's conclusion. In addition, the FYR process evaluates new information to ensure the remedies are (or will be) protective of human health and the environment and, in general, is not intended to reconsider decisions made during the remedy selection or design process (unless prompted by new information). Accordingly, the Navy's evaluation of the 2018 State of California Sea Level Rise Guidance document focused on the probabilistic estimates of sea level rise, and did not consider the H++ scenario (which is intended to support planning and adaptation strategies for projects that are not sufficiently similar to the shoreline protection structures at Parcels B-1, B-2, E, E-2, and IR-07).

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
18	6-15	6.3	The Report mentions the concerns regarding the compromised radiological data elsewhere, but does not address it in the answer to Question C ("Has any other information come to light that could call into question the protectiveness of the remedy?"). Please add a discussion about the compromised radiological data to this section as this is Important information that has come to light since the Third Five-Year Review.	Consistent with EPA guidance, Section 6.3 focuses on "other information" (i.e., information that is not already discussed in Sections 6.1 and 6.2) that could call into question the protectiveness of the remedy. However, to further clarify the text, Section 6.3 was revised to include a reference to Section 6.1.6, where the issue related to the radiological remediation was discussed.
19	--	7	The Report appears to use issue categories that are not standard in the USEPA's Five- Year Review Recommended Template (January 2016). It is recommended that the categories referenced be revised to match the new template: "Remedy Effectiveness" would become "Remedy Performance" and "Remedy Protectiveness" would become "Other."	Section 7 was revised to describe the issue categories consistent with the terms provided in the 2016 EPA template.
20	--	7	The Report does not include a table for sites where no issues or recommendations were identified. Please add a table for IR-07 and IR-18 stating that no issues were identified. Similarly, although work at Parcel E-2 is not complete, the parcel should be discussed briefly in this section.	The first paragraph in Section 7 was revised to include the following clarification: "*Issues were identified at all HPNS parcels, except for IR-07/18 and Parcel E-2, with complete or partially complete remedies.*"
21	7-1	7	The Report discusses a need to reevaluate the SVE remedy at sites where it has been implemented, but fails to address the three areas where it has not been initiated. Please add text regarding these three areas where the SVE remedy has not been implemented to indicate if this evaluation will take place at these sites as well.	The subject table in Section 7 was revised to include the following clarification: "*Changes made to the treatment approach should be considered for any other SVE treatment areas at HPNS, including areas where treatment is planned but has not yet been initiated.*"
22	--	8	This section of the Report does not include protectiveness statements for Parcels E and E-2. Please clarify that the remedies are not yet in place for Parcels E and E-2, but that they will be included in the next draft.	Section 8 was revised to include protectiveness statements for Parcels E and E-2. Consistent with EPA guidance, protectiveness statements should be prepared for all operable units where an RA is currently underway or remediation construction is complete.

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
23	8-2	8.4	The Report indicates that treatment is expected to start at Areas 4 and 5 in 2018, but does not indicate when it might start at Area 2. Please update the text with an approximate start date for SVE operation at Area 2.	Please refer to the response to DTSC Comment 8.
24	--	Figure 3	The figure legend does not specify what type of contours are represented on the figure. Please update the legend to indicate that these contours are topographic.	Figure 3 was revised as requested.
25	--	Figure 5	The Report text mentions the different Installation Restoration (IR) sites on the parcel, but the figure does not indicate where these IR sites are found. Please revise the figure to indicate where the boundaries of IR-10, IR-23, and IR-26 are located.	Figure 2 identifies the IR sites throughout HPNS. Section 2.2 introduces Figure 2, and a similar introductory statement was added to Section 3.3.
26	--	Figure 8	The figure legend includes Shoreline Revetment, Shoreline Natural Sand, and ISS Treatment Area, but it is virtually impossible to identify these areas on Figure 8. Please revise for clarity.	Figure 8 was revised as requested.
27	--	Figure 8	The figure legend does not include a description for the groundwater plume boundaries shown on the site map. Please add a description for the plume boundaries to the legend.	Figure 8 was revised as requested.
28	--	Figure 8	The figure includes lines for a drainage channel and topographic contours, but these cannot be distinguished on the figure. Please revise Figure 8 so that these two site map features are easily distinguished.	Figure 8 was revised as requested.
29	--	Figure 8	The figure includes symbols for existing and new groundwater wells, but the symbol size is too small to distinguish between the different well categories. Please revise so that these site map features are easily distinguished.	Figure 8 was revised for clarity (the symbols were enlarged to be more legible and simplified to be consistent with the level of detail presented on Figure 9).
30	--	Figure 9	The figure title states that it is for Parcel E, but it is for Parcel E-2. Please revise the figure title.	Figure 9 was revised as requested.

Table 2. Responses to Comments from the DTSC[2] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by DTSC Project Manager (Nina Bacey), dated September 14, 2018				
31	--	Figure 9	The figure legend includes lines for the proposed right-of-way and leachate extraction trench, but these cannot be distinguished on the figure. Please revise so that these two site map features are easily distinguished.	Figure 9 was revised to delete the proposed right-of-way because it is not part of the proposed remedy and it obscures several remedy components (e.g., the groundwater diversion drain) that should be depicted. The figure was also revised to delete the leachate extraction trench because (1) it is an ancillary component of the remedy (that is not critical for this type of summary figure) and (2) it aligns with the edge of the proposed service road along the Parcel E-2 shoreline and is not easy to distinguish on a standard-sized drawing.
32	--	Figure 9	The figure legend includes lines for the groundwater diversion drain and approximate limit of geosynthetic cap, but these cannot be identified on the figure. Please revise so that these two site map features are easily identified or delete from the legend if they are not used.	Figure 9 was revised as requested.
33	--	Figure 13	The figure legend does not include the topographic contours. Please add topographic contours to the legend.	Figure 13 was revised as requested.
34	--	Appendix A	The appendix includes some incomplete references that do not include document details, including titles and dates. Please revise these entries so that documents can be identified and reviewed.	Appendix A was revised to ensure that all reference documents include complete titles and publication dates.

Table 2. Responses to Comments from the DTSC on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by CDPH Senior Health Physicist (Sheetal Singh), dated September 14, 2018				
General Comments				
1	--	3	The sections of the Response Action Summary for Parcels B-1, B-2, C, D-2, G, UC-1, UC-2, and UC-3 contain the comment, *"All radiological work is currently being reviewed to determine if current site conditions are compliant with the RAOs."* In what fashion will the results of these reviews be communicated to regulatory agencies?	The results of the radiological reviews (and associated field investigations) will be summarized in future reports that will be submitted to the FFA signatories and CDPH for review. The proposed format of these reports will be described in work plans that are being prepared for each HPNS parcel that requires reevaluation.
Specific Comments				
2	3-7, 4th ¶	3.3.1.1.	*"An asphalt cover, rather than a 2-foot-thick soil cover, was constructed over a small area (about 60 feet by 130 feet) in the northeastern corner of IR-07 to allow for a more gradual transition to the final asphalt cover in the adjoining area of Parcel 8-1."* Please correct location of the asphalt cover to, "southeastern corner". Please include a page reference to Figure 3, "Overview of Remedy components for IR-07/18".	Section 3.3.1.1 was revised as requested.

Table 3. Responses to Comments from the Water Board[3] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Water Board Groundwater Protection Division Project Manager (Tina Low), dated September 14, 2018				
1		Section 2.	This section describes the location, physical characteristics, and acreage of the parcels that comprise the Hunters Point Naval Shipyard (HPNS). It is our understanding that Parcel B-1 would be split such that the area surrounding IR-10 would be cut out. Per discussions with the regulatory agencies, this IR-10 area contains TCE concentrations that would take a longer time to address, and this area would therefore be "cut out" to facilitate the transfer of the remainder of Parcel B-1. Please clarify whether the Navy still intends to split Parcel B-1, and revise the relevant portions of this Five-Year Review accordingly.	The IR-10 carve-out is currently part of Parcel B-1. When Parcel B-1 is evaluated for transfer in the future, following completion of the radiological rework and the subsequent restoration of the durable covers, the Navy will evaluate the progress of SVE treatment within IR-10 and may separate the IR-10 carve-out for transfer at a later date if additional remediation is required to address soil gas in the area. The report was not revised in response to this comment.
2		Section 3.3.1.2	This section discusses the results of groundwater monitoring at IR07/18. The selected groundwater remedy consists of monitored natural attenuation (MNA) and institutional controls (ICs) to restrict specific land uses and activities. This section summarizes the groundwater monitoring activities performed at two wells, but does not discuss whether the selected remedies are protective. How is the progress of MNA evaluated? Do the monitoring data indicate that MNA is achieving the remedial goals, and that the conditions necessary for MNA to be successful are present? Please also further discuss the exceedance of the remedial goal (RG) for lead in groundwater. Is the source of the lead known, and what are the next steps?	Section 3.3.1.2 summarizes the groundwater monitoring results for IR-07/18 to support the technical assessment provided in Section 6.1.4 and the protectiveness statement in Section 8.1. Consistent with the RAOs summarized in Table 3, the groundwater monitoring results are compared with either well-specific trigger levels (for select metals) or RGs (for select radionuclides). Section 3.3.1.2 was revised to more clearly state that, with the exception of lead, concentrations of metals and radionuclides have not exceeded their evaluation criteria (and therefore support the protectiveness statement in Section 8.1). Lead in A-aquifer groundwater is not a new COC. Lead and other metals, including chromium VI, copper, mercury, nickel, and selenium) have historically been detected in A-aquifer groundwater at IR-07/18 and pose a potential risk to aquatic life in San Francisco Bay. The RAMP for IR-07/18 specifies monitoring of two wells in IR-07, and metals concentrations are compared against trigger levels. As noted in Section 3.3.1.2, lead concentrations exceeded the trigger level in September 2017 for the first time in 10 years. Section 3.3.1.2 was revised to clarify that, in accordance with the RAMP, the sporadic nature of this exceedance does not warrant any immediate action, but the Navy will continue monitoring for lead in A-aquifer groundwater and will evaluate concentration trends in future monitoring reports.

[3] Acronyms and abbreviations are summarized at the end of this attachment.

Table 3. Responses to Comments from the Water Board[3] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Water Board Groundwater Protection Division Project Manager (Tina Low), dated September 14, 2018				
3		Section 3.3.2	This section states that in-situ treatment of mercury using a stabilizing agent is currently underway at IR-26 on Parcel B-2 to minimize migration of mercury in groundwater to the bay. This section further states that the results of groundwater treatment and performance monitoring for mercury will be reported in a future Remedial Action Completion Report (RACR). Please revise this section to add that, should the performance monitoring show that the in-situ treatment is not reducing mercury concentrations as intended, the RACR will recommend next steps (such as further analysis and/or treatment) to address the discharge of mercury to San Francisco Bay from IR-26.	Section 3.3.2 was revised to include the following clarification: "*If performance monitoring shows that in-situ treatment is not reducing mercury concentrations as intended, the Navy will recommend next steps (such as further analysis and/or treatment) to address the discharge of mercury to San Francisco Bay from IR-26.*"
4		Section 3.3.6	A significant amount of mobile NAPL was removed from the Former Oily Waste Ponds (IR-03) during the In-Situ Thermal Remediation (ISTR) pilot study. We suggest revising this section to include a summary of the ISTR pilot study and the NAPL reduction achieved by the ISTR treatment.	Section 3.3.6 was revised to summarize the treatability study at IR-03 that evaluated NAPL treatment using ISTR and ISS technologies.
5		Section 3.3.7.2	The last sentence of this section (on page 3-30) cites "Navy, 2012" as the reference for the remedial action monitoring plan (RAMP). Please correct the citation to "ERRG, 2014"	Section 3.3.7.2 was revised to appropriately reference the Final RD Package for Parcel E-2, which contains the RAMP as an appendix.
6		Section 6.1.5	This section asserts that the MNA and LTM remedies are functioning as intended, but does not provide a technical discussion to support that assessment. Please revise this section to provide a summary of how the data were evaluated to demonstrate that concentrations of COCs in groundwater are attenuating as expected.	Section 6.1.5 was revised to explain why an evaluation of MNA at VOC plumes is not required as part of the technical assessment (based on the reasons stated in the response to EPA General Comment 12) and to provide a more clear assessment of LTM at areas with dissolved metals in groundwater.

Table 3. Responses to Comments from the Water Board[3] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Water Board Groundwater Protection Division Project Manager (Tina Low), dated September 14, 2018				
7		Section 6.2.2	This section does not address the change in understanding of the contaminant characteristics of TCE. In July 2014, USEPA issued a memorandum titled EPA Region 9 Response Action Levels and Recommendations to Address Near-Term Inhalation Exposures to TCE in Air from Subsurface Vapor Intrusion (EPA 2014 Memo). The recommendations and action levels set forth in the EPA 2014 Memo "address a particular concern for TCE focusing on protecting sensitive and vulnerable populations, especially women in the first trimester of pregnancy (because of the potential for cardiac malformations to the developing fetus)." The remedies for HPNS sites where TCE is a COC should be evaluated to determine whether they are protective of future residents and occupants, given concerns about the short-term exposure risk associated with TCE.	The 2014 EPA memorandum references toxicity criteria for TCE that were last updated in 2011, and provides recommendations for using this updated criteria to develop interim action levels for indoor air. The Navy's 2011 SGAL technical memorandum used the 2011 toxicity criteria for TCE, and developed a risk-based concentration for indoor air (0.59 micrograms per cubic meter) that is more conservative than the interim action levels identified in the 2014 EPA memorandum. Accordingly, no revisions were made in response to this comment. As discussed in the response to EPA General Comment 3, the report was revised to include new Appendix E, which discusses how the previous estimates for vapor intrusion risk at Parcels B-1, B-2, D-1, G, UC-1, and UC-2 may be impacted by EPA's request. The Navy will continue to work with the regulatory agencies to resolve concerns regarding protectiveness from vapor intrusion prior to transfer of the property.
8		Section 7	We agree that SVE implementation in Parcels B-1 and C has had limited effectiveness due to diffusion-limited conditions in the subsurface. With the current understanding of the short-term exposure risk of TCE, we recommend other source- reduction measures (such as excavation) be evaluated, if TCE concentrations in soil gas remain high after continued SVE operation and optimization.	Comment acknowledged. Section 7 describes the Navy's approach to resolving this issue as follows: "*Site-specific studies (e.g., remedy analyses) should be performed to estimate the magnitude and extent of source mass at each treatment area in Parcels B-1 and C to determine if other measures could be implemented to enhance SVE performance in the future.*"

Table 3. Responses to Comments from the Water Board[3] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Water Board Groundwater Protection Division Project Manager (Tina Low), dated September 14, 2018				
9		Section 8.	In the discussion of Parcel B-1, the text states that operation of the SVE system at IR-10 is ongoing, and institutional controls (ICs) will be relied upon in the future to protect human health. We are concerned about the long-term protectiveness of relying on the current ICs if the TCE concentrations in soil gas remain high after SVE operation ceases. The current ICs rely on future installation of Vapor Intrusion Mitigation Systems (VIMS) to prevent exposure. While VIMS may be an effective means for eliminating the vapor intrusion exposure risk, they are not a replacement for complete cleanup to the extent feasible. Furthermore, the long-term effectiveness of VIMS for mitigating TCE exposure is uncertain. Given the short-term exposure risk of TCE, as discussed in Comments 7 and 8 above, we recommend evaluating remedies that can provide more certainty with regards to long-term protectiveness.	Please refer to the response to Water Board Comment 8.

Table 4. Responses to Comments from the SFDPH[4] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Environmental Engineer (Amy Brownell), dated September 14, 2018				
General Comments				
1		Section 6	In Section 6 Technical Assessment, it would helpful if discussion was organized by Parcel since Sections 3, 4 and 5 are organized by Parcel. In addition, the report should reference each of the documents, listed in Appendix A, that describe the most recent remedial actions and effectiveness of the remedial action, and a brief discussion of data trends for on-going monitoring (e.g., groundwater, soil gas) being conducted to determine remedy effectiveness (see also Specific Comments) for any projects that have not yet been completed (i.e. issuance of a final RACR).	Section 6 was organized to minimize repetition when assessing remedy components that are common to multiple parcels. Sections 3 and 4 discuss specific details that vary for each parcel, but the technical assessment provides information that applies to multiple parcels. Accordingly, the Navy does not believe that the recommended reorganization of Section 6 would improve the clarity of the report. In addition, Section 3 provides detailed information for each parcel, including reference citations to relevant documents, to support the technical assessment provided in Section 6. The introductory paragraphs in Section 6 state that the technical assessment is based on information presented in the previous sections. Accordingly, the Navy does not believe that the recommendation (to repeat detailed reference citations from Section 3 in Section 6) would improve the clarity of the report. No revisions were made in response to this comment.
Specific Comments				
2	Page 2-5	Section 2.5.2	Please revise the first sentence as follows: "The anticipated future use of HPNS is described in the San Francisco Office of Community Investment and Infrastructure's Hunters Point Shipyard Redevelopment Plan, as currently amended."	Section 2.5.2 was revised as requested.
3	Page 2-5	Section 2.5.3	This section states that, "the Navy concluded that maximum contaminant levels (MCLs) were not applicable or relevant and appropriate requirements (ARARs) for CERCLA cleanups at HPNS based on an evaluation of site-specific factors". Please provide a reference at the end of this discussion (p. 2-6) to the document in which this evaluation is described.	The evaluation of site-specific factors was provided in multiple documents issued between 2007 and 2011. Section 2.5.3 was revised to include reference citations to each document.

[4] Acronyms and abbreviations are summarized at the end of this attachment.

Table 4. Responses to Comments from the SFDPH[4] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Environmental Engineer (Amy Brownell), dated September 14, 2018				
Specific Comments *(continued)*				
4	Page 3-11	Section 3.3.2.1	The first paragraph states, "The SVE system was constructed between December 2012 and May 2013" and "operation of the SVE system is ongoing." Please add a reference to the SVE monitoring report that discusses current SVE performance and provide a brief description of data trends. Similarly, this section states that, "Polylactate injection in groundwater at IR-10 was performed between February and March 2013, and post-injection performance monitoring is ongoing." Please add a reference to the groundwater monitoring report that discusses the groundwater remedy's current performance and provide a brief description of data trends. A 5-year review is incomplete if the efficacy of on-going remedial activities is not discussed.	Section 3.3.2.1 was revised to refer to the Draft RACR for Parcel B-1, which describes the expansion, commissioning, and operation of the SVE system and the implementation of polylactate substrate injections during the RA construction period. No formal reports have been prepared since the publication of the Draft RACR to document the progress of SVE system operation in IR-10; however, the Navy has been collecting system performance and treatment data since operation resumed in late 2017. Section 3.3.2.1 was revised to note the Navy's plans to prepare (1) formal progress reports at the end of each operations year to summarize treatment progress and (2) a RACR specific to IR-10 to document the final results of treatment upon completion of remedy implementation. Section 3.3.2.1 was also revised to refer to the most recent semiannual groundwater monitoring report, which details the post-injection monitoring results. In addition, the existing text in Section 3.3.2.2 states that post-injection monitoring results "*indicate an overall reduction in the concentrations of TCE over time, but more data collection is required to make any definitive determinations about long-term TCE concentration trends.*" The Navy does not believe that any additional information is required in this FYR report for the reasons provided in the response to EPA General Comment 12.
5	Page 3-19	Section 3.3.3.2	Section 3.3.3.2 states that "periodic monitoring reports are published that describe the monitoring results and compare the results to the RGs or TLs." Please add a reference to the groundwater monitoring report that discusses current performance and provide a brief description of data trends. A 5-year review is incomplete if the efficacy of on-going remedial activities, including long-term monitoring, is not discussed. Same comment applies to Parcel E-2, among others.	Section 3.3.3.2 was revised to reference the most recent semiannual groundwater monitoring report. Also, Section 3.3.3.2 was revised to summarize the recent groundwater results relative to well-specific trigger levels. In addition, Section 3.3.3.2 was revised to describe the planned performance monitoring at VOC plumes where in-situ treatment has occurred. The Navy does not believe that any additional information (regarding the evaluation of VOC concentration trends in groundwater) is required in this FYR report for the reasons provided in the response to EPA General Comment 12.

Table 4. Responses to Comments from the SFDPH[4] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Environmental Engineer (Amy Brownell), dated September 14, 2018				
Specific Comments *(continued)*				
6	Page 3-35, 2nd para	Section 3.3.10.2	Your description of O&M inspections and related activities performed is out of date. Please update your wording to reflect that the FFA Signatories were provided the 2017 Annual Operation and Maintenance (O&M) Inspection Checklist and Risk Management Plan (RMP) Report Form for Parcels UC-1 and UC-2, as prepared by the Geosyntec-Albion Joint Association on behalf of CP DevCo for OCII, via email on 9 April 2018. Please incorporate the information provided in this Five Year Review.	Section 3.3.10.2 was revised as requested.
7	Page 6-4	Section 6.1.3	The first sentence states "Are the SVE remedies implemented in Parcels B-1 and C functioning as intended by the decision documents? YES." On page 6-5, the second paragraph states "This review has determined that SVE, although being implemented in accordance with the RODs and RDs and meeting the ROD objective of removing VOCs, is not operating efficiently to reduce the mass of source contamination in soil. Optimization of the existing SVE systems will not significantly improve source mass reduction." Since the SVE systems are not operating efficiently to reduce the contaminant source, please consider if this statement should be NO. Does this limited reduction include all Areas in Parcel C (1, 3, 6, 7, and 8) and IR-10? Please add detail regarding the Areas that have achieved limited reduction. Please reference the most recent Remedial Action Completion Reports or SVE Monitoring reports that presents current SVE concentrations and mass removal calculations.	As discussed in Sections 6.1.3 and 7, the SVE technology will be closely evaluated for each treatment area due to inefficiency caused by diffusion-limited conditions. Section 7 describes the Navy's recommendation to resolving this issue as follows: "*Site-specific studies (e.g., remedy analyses) should be performed to estimate the magnitude and extent of source mass at each treatment area in Parcels B-1 and C to determine if other measures could be implemented to enhance SVE performance in the future.*" Section 6.1.3 was not revised in response to this comment because the selected remedies to minimize exposure to VOCs in soil gas include multiple components, including treatment, monitoring, and ICs. The Navy does not believe that an assessment of compliance with the soil gas RAO (to minimize exposure to VOCs in soil gas) can be made solely on the basis of evaluating SVE system performance. Sections 3.3.2 and 3.3.3 summarize the available information related to SVE system operation at Parcels B-1 and C. No further revisions were made to these section in response to this comment.

Table 4. Responses to Comments from the SFDPH[4] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Environmental Engineer (Amy Brownell), dated September 14, 2018				
Specific Comments *(continued)*				
8	Page 6-4	Section 6.1.3	Please provide an explanation as to why SVE treatment in Area 2 is not conducted or planned (i.e., has it been completed or is it scheduled to occur in 2019?).	Sections 6.1.3 and 8.4 were revised to clarify that SVE treatment at Area 2 is pending implementation of other RA activities to address soil and groundwater contamination. In addition, Section 8.4 was revised to state: "*The Navy is currently evaluating the proposed SVE operations plans in conjunction with the proposed soil excavation and groundwater treatment plans for these areas and will be issuing a report describing the proposed paths forward.*"
9	Page 6-6	Section 6.1.5	The third paragraph states "No opportunities for further optimization or early indicators of potential problems were identified for the MNA and LTM remedies during this review." Several comments (above) have noted the absence of any discussion of data trends for groundwater monitoring events. After responding to the above comments, please revisit this statement, especially for those parcels in which consistent exceedances of criteria were noted.	Section 6.1.5 was revised to explain why an evaluation of MNA at VOC plumes is not required as part of the technical assessment (based on the reasons stated in the response to SFDPH Comments 4 and 5, as well as EPA General Comment 12) and to provide a more clear assessment of LTM at areas with dissolved metals in groundwater.
10	Page 6-11	Section 6.2.2	The soil gas subsection of Section 6.2.2 states "the regulatory agencies are currently reviewing and reevaluating their methods for assessing vapor intrusion risk" and refers to Section 6.2.3; however, it is not clear in Section 6.2.3 which methods are still being evaluated by the regulatory agencies such that the Navy couldn't re-evaluate the ARICs at present time rather than during an unspecified time in the future. Please clarify the 'methods still being evaluated by regulatory agencies' and better define the timeline for reevaluation of SGALs/ARICs by the Navy.	Section 6.2.3 provides a detailed explanation of the Navy's current methodology for assessing vapor intrusion risk and summarizes the technical concerns that have been previously expressed by EPA and DTSC. As discussed in the response to EPA General Comment 3, the report was revised to include new Appendix E, which discusses how the previous estimates for vapor intrusion risk at Parcels B-1, B-2, D-1, G, UC-1, and UC-2 may be impacted by EPA's request. The Navy will continue to work with EPA and DTSC to resolve their technical concerns.

Table 4. Responses to Comments from the SFDPH[4] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Environmental Engineer (Amy Brownell), dated September 14, 2018				
Specific Comments *(continued)*				
11	Page 6-11	Section 6.2.2	This section of the Five Year review is unclear about the future state of VOC ARIC designations. This comment is offered in order to clarify the documentation that might impact construction of occupied enclosed structures at some point in the future on pieces of Parcels UC-1 and UC-2 (i.e. at this current time, no structures are planned for the areas mentioned in this comment). As a reminder, the Navy has committed to re-evaluate the soil data generated during the past radiological testing, specifically, in sections of Fisher and Spear streets which are part of UC-1 and UC-2. Fisher and Spear have continued to be used exclusively as streets for personal and construction vehicles with no subsurface activity occurring since they were transferred from the Navy to OCII in 2015. Since there is no subsurface activity occurring, this comment is made only to verify the status of the documents that inform subsurface activity that might eventually lead to construction of occupied enclosed structures so that we may continue to track such information.	The Navy, in consultation with EPA and DTSC, will reevaluate criteria for designating VOC ARICs to ensure that future protectiveness aligns with the most current risk assessment methodology. The methodology for developing SGALs directly affects how VOC ARICs are defined. Please see the response to SFDPH Specific Comment 10 for further information. The Navy will consult OCII during future discussions with EPA and DTSC. If the VOC ARIC designations for Parcels UC-1 and UC-2 require adjustment, then the OCII will be provided those revised designations through the transfer documents for incorporation into its Risk Management Plans.
12	--	Table 12	Table 12 includes the RAO "Prevent Exposure to ROCs at activity levels that exceed remediation goals for all potentially complete exposure pathways." Please include this statement under the RAO header "Radiologically Impacted Media and Structures" as presented in Table 11.	Table 12 is consistent with the RAOs presented in the ROD for Parcel E-2. Most land areas at Parcel E-2 are radiologically-impacted media, thus the proposed remedy addresses both non-radioactive chemicals and radionuclides throughout Parcel E-2. No revision was made in response to this comment.
Minor Comments				
13	Page 3-5	Section 3.2.4.	In the paragraph before last when Table 12 is referenced, the hash tag clicking on this Table leads to the attached Table 11 instead of 12. Please correct this discrepancy.	The hyperlink to Table 12 was corrected.

Table 4. Responses to Comments from the SFDPH[4] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by Environmental Engineer (Amy Brownell), dated September 14, 2018				
Minor Comments *(continued)*				
14	Page 3-23 First bullet	Section 3.3.6.1	The first sentence states "The selected remedy for soil, soil gas, and shoreline sediment consists of (1) removal and disposal of contaminated soil in selected areas (referred to as Tier 1, Tier 2, and TPH locations[2]) that contain nonradioactive chemicals (including metals, SVOCs, PCBs, and TPH[3]). Footnote 1 is missing, please correct superscripts to 1 and 2 and correct footnotes at the bottom of the page.	All footnotes in the document are numbering sequentially. Section 2.5.3 contains the first footnote, which is why the footnotes in Section 3.3.6.1 did not begin with the number 1. The draft final report was revised to include an additional footnote within Section 3.3.2.1, so the subject footnotes are now numbered 3 and 4. No revision was made in response to this comment.
15	Page 3-28	Section 3.3.7.1.	The last two sentences of this section state "The Phase 3 RAWP for Parcel E-2 was started in 2017, and the Draft RAWP was submitted in February 2017 (KEMRON Environmental Services, Inc., 2018)." Please change "February 2017" to "February 2018."	Section 3.3.7.1 was revised to correct this error.
16	Page 3 of 4	Table 2	Top of Column 2, "TMSRA" is not defined previously in the document. Please also include the TMSRA as "Technical Memorandum in Support of a ROD Amendment" in the "Abbreviations and Acronyms" list.	Table 2 independently defines all acronyms and abbreviations, including the term "TMSRA." The acronyms and abbreviation list in the main text is limited to those terms used in the main text, which does not include the term "TMSRA." No revision was made in response to this comment.
17	Page 1, 2nd col, 3rd row	Table 4	Please change "coil" to "soil."	Table 4 was revised to correct this error.
18	--	List of Abbrevia-tions and Acronyms	Please add the "COPECs = chemicals of potential ecological concern" to the list of Abbreviations and Acronyms at the beginning of the report.	The report was revised to properly define this acronym.

Table 5. Responses to Comments from the BCDC[5] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by BCDC Coastal Planner (Clesi Bennett), dated September 7, 2018				
1	--	--	Sea Level Rise. The State of California Sea Level Rise Guidance document recommends that project proponents decide which sea-level rise projection to select - and the necessary adaptation pathways and contingency plans to ensure resilience to sea level rise. These determinations are based on a variety of factors, including location, lifespan of the project, adaptive capacity and risk tolerance/aversion. The Guidance summarizes the best available sea- level rise science, which includes probabilistic projections based on several greenhouse gas emissions scenarios, as well as an extreme scenario that accounts for total arctic ice loss. It recommends project proponents consider the risks associated with various sea-level rise projections and determine tolerance for, or aversion to, those risks when planning for the future. The Guidance also promotes an "adaptation pathway" as a planning approach to address the uncertainty and challenges of climate change decision-making. Finally, given that future sea-level rise is uncertain, the Guidance enables consideration of multiple possible futures and allows analysis of the robustness and flexibility of various adaptation approaches across those multiple futures. BCDC staff recommends that the Guidance be fully incorporated into the Draft Fourth Five- Year Review for the HPNS as it relates to sea-level rise adaptation and planning for shoreline parcels containing toxic substances. For planning and designing shoreline projects, the Guidance specifically recommends a five-step process, including: 1) identify the nearest tide guide; 2) evaluate the project lifespan; 3) identify range of sea-level rise projections; 4) evaluate potential impacts and adaptive capacity across a range of sea-level rise projections and emissions scenarios; and 5) select sea-level rise projections based on risk tolerance and, if necessary, develop adaptation pathways that increase resiliency to sea-level rise and include contingency plans if projections are exceeded.	The Navy has evaluated potential sea level rise when designing shoreline protection structures at Parcels B-1, B-2, E, E-2, and IR-07 and has engaged the regulatory agencies (including BCDC) to obtain and incorporate their input throughout the process. The shoreline protection designs, which were reviewed and accepted by the regulatory agencies, provided a reasonable degree of protection from wind-generated waves, extreme high tide events, and future sea level rise. The Navy understands that scientific research regarding sea level rise is an ongoing process, and the Navy will continue to evaluate new research in future FYRs to ensure the shoreline structures meet their design objectives. The shoreline structures can be adapted to increase the crest elevation if deemed necessary based on future evaluations. In the Fourth FYR Report, the Navy evaluated the most current scientific research and verified that no changes to the shoreline protection structures are needed. The response to comment 2 (on the following page) provides further information to support the Navy's conclusion. In addition, the FYR process evaluates new information to ensure the remedies are (or will be) protective of human health and the environment and, in general, is not intended to reconsider decisions made during the remedy selection or design process (unless prompted by new information). Accordingly, the Navy's evaluation of the 2018 State of California Sea Level Rise Guidance document focused on the probabilistic estimates of sea level rise and did not consider the H++ scenario (which is intended to support planning and adaptation strategies for projects that are not sufficiently similar to the shoreline protection structures at Parcels B-1, B-2, E, E-2, and IR-07).

[5] Acronyms and abbreviations are summarized at the end of this attachment.

Table 5. Responses to Comments from the BCDC[5] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by BCDC Coastal Planner (Clesi Bennett), dated September 7, 2018				
2	--	--	In the draft five-year report, three feet of sea-level rise was selected when designing the crest elevation for parcels E and E-2 based on the Griggs et al, 2017 Rising Seas in California report, a predecessor for the more recently revised 2018 Update to the State of California Sea- Level Rise Guidance, discussed above. Three feet of sea-level rise falls within the low risk aversion projection range (2.4-3.4 feet), suitable for projects with high adaptive capacity and low consequences from inundation. The example provided in the Guidance is an unpaved coastal path. If water levels were to overtop shoreline protection structures, the mobilization of contaminants would cause considerable public health, public safety, or environmental impacts for both the natural and built environment of San Francisco Bay. We recommend selecting a higher risk aversion criteria and projection for sea-level rise than three feet of sea-level rise, given that the remediation plan for areas of parcels E and E-2 is to bury contaminated material in place, as the human health risks of the potential mobilization of contaminants warrants elevated risk criteria. Moreover, the project should consider the total water level of flooding for the site, including wave action. Factors such as additional water from storm surges and seasonally high tides, as well as groundwater rise, should also be considered. Additionally, the Bayview Hunters Point community is considered a vulnerable population. The census tracts that comprise this community rank in the 85-90th percentile and the 90-95th percentile (measured by both pollution burden and population characteristics) on the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment's California Communities Environmental Health Screening Tool, version 3.0 (CalEnviroScreen 3.0) and is designated as a Senate Bill 535 "Disadvantaged Community" by the State of California. The Bayview Hunters Point community is one of the most at-risk communities for pollution in the state. The potential mobilization of contaminants would exacerbate an already high pollution burden for this community.	As outlined in the approved design documents, the shoreline protection structures are designed to control erosion from tidal and wave action from San Francisco Bay, which is an important factor in ensuring the integrity of the durable covers constructed in upland areas. The approved designs accounted for a potential 3-foot increase in sea level (over the next 100 years) when establishing the crest elevations for each shoreline protection structure. Contrary to the reviewer's assertion, the design objectives do not require that overtopping of the shoreline protection structures be prevented. This design decision is based on several practical considerations, including: • Raising the height of the shoreline protection structures would increase their weight and would likely impact slope stability along the shoreline (e.g., increasing the threat of slope failure following an earthquake). • The durable covers in upland areas are designed to resist erosion from surface water runoff and, at existing waste management units (e.g., the Parcel E-2 Landfill), include protective liners to limit infiltration into buried waste. In addition, the shoreline protection structures at Parcels B-1, B-2, E, E-2, and IR-07 are located in areas planned for future open space; which, consistent with the reviewer's comment, would have low consequences from inundation. Based on this information, the Navy has verified that no changes to the shoreline protection structures are needed.

Table 5. Responses to Comments from the BCDC[5] on the Draft Five-Year Review for Hunters Point Naval Shipyard, San Francisco, California, dated July 2018

Comment #	Page #	§	Comment	Response
Comments provided by BCDC Coastal Planner (Clesi Bennett), dated September 7, 2018				
3	--	--	Using the framework presented above, BCDC staff recommend the incorporation of the recently revised 2018 Update to the State of California Sea-Level Rise Guidance in designing the project and planning for sea-level rise at the HPNS site, including undergoing an analysis of the appropriate risk aversion criteria for the project based on the high public health and safety risks and potential irreversible damage from inundation, as well as the presence of a vulnerable population. As mentioned above, it is also important to consider water from storm surges and king tides as well as groundwater rise. While the Draft Fourth Five-Year Review for the HPNS only explicitly mentions analysis of sea-level rise for Parcel E and E-2, BCDC staff believe that the state sea-level rise guidance framework should be applied to all shoreline parcels.	Section 6.3 in the FYR report was revised to better explain why the new information related to sea level rise (as provided in the 2018 guidance document) does not call into question the protectiveness of the remedies.

AFT

ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirements
ARICs	areas requiring institutional controls
BCDC	San Francisco Bay Conservation and Development Commission
BGMP	basewide groundwater monitoring program
BPRG	building preliminary remediation goal
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPECs	chemicals of potential ecological concern
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ESDs	Explanations of Significant Difference
FFA	Federal Facility Agreement
FOST	Finding of Suitability to Transfer
FYR	five-year review
HPALs	Hunters Point ambient levels
HPNS	Hunters Point Naval Shipyard
ICs	institutional controls
IR	Installation Restoration
ISB	in-situ bioremediation
ISS	in-situ solidification/stabilization
ISTR	in-situ thermal remediation
JEM	Johnson and Ettinger Model
LTM	long-term monitoring
LUC RD	Land Use Control Remedial Design
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCLs	maximum contaminant levels

Acronyms and Abbreviations *(continued)*

AFT

MCP	Monitoring and Control Plan
MNA	monitored natural attenuation
NAPL	nonaqueous-phase liquid
NAVD88	1988 North American Vertical Datum
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	operation and maintenance
OCII	Office of Community Investment and Infrastructure
OPC	Ocean Protection Council
OSWER	Office of Solid Waste and Emergency Response
PCB	polychlorinated biphenyl
PFAS	per- and polyfluoroalkyl substances
PQAL	practical quantitation limit
PQLs	project quantitation limits
PRG	preliminary remediation goal
RA	remedial action
RACR	Remedial Action Completion Report
RAMP	Remedial Action Monitoring Plan
RAOs	remedial action objectives
RAWP	Remedial Action Work Plan
RBC	risk-based concentration
RD	remedial design
RGs	remediation goals
ROCs	radionuclides of concern
ROD	Record of Decision
RU	Remedial Unit
SFDPH	San Francisco Department of Public Health
SGALs	soil gas action levels
SLR	sea-level rise
SVE	soil vapor extraction
SVOCs	semivolatile organic compounds
TCE	trichloroethene
TCRAs	time-critical removal actions
TLs	trigger levels

Acronyms and Abbreviations *(continued)*

AFT

TMSRA	Technical Memorandum in Support of a ROD Amendment
VIMS	Vapor Intrusion Mitigation Systems
VOC ARICs	areas requiring institutional controls for volatile organic compound vapors
VOCs	volatile organic compounds
Water Board	San Francisco Bay Regional Water Quality Control Board
yr	year
ZVI	zero-valent iron
µg/L	micrograms per liter
--	not applicable
§	Section